BCX ENVIRONMENTAL CONSULTING

Alternative Fuel Demonstration Project Summary Report

St. Marys Cement Inc. (Canada) – Bowmanville Cement Plant ECA No. 4614-826K9W

Report to: Standards Development Branch
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Executive Summary

In November 2014, St Marys Cement Inc. (Canada) [SMC] received approval from the Ontario Ministry of the Environment, Conservation and Parks (Ministry) to undertake a time-limited demonstration project at their cement plant located at 400 Bowmanville Avenue, in Bowmanville, Ontario (Facility) to gather site specific air quality data when the Facility's conventional fuel, is substituted with up to 12 tonnes of the alternative fuels as specified in the air approval and below.

Alternative Fuel	Description	Maximum Input Rate (tonnes/hour)
Post-composting plastic polymers and wood residuals	Shredded and dried plastic film and other plastic materials removed from finished compost.	5.5
Plastic polymers, paper fibres and woody residuals derived from industrial and/or post consumer sources.	Shredded plastic and other materials removed from post consumer recycling or from industrial manufacturing process.	6.5

SMC subsequently conducted an alternative fuel demonstration project at their Facility, from September 30th, 2018 to October 2nd, 2018, from October 10th to 12th, 2018 and from December 4th, 2018 to December 8th, 2018.

The purpose of the alternative fuel demonstration project was to:

(a) Demonstrate compliance with Regulation 419/05 Schedule 3 standards at the maximum Point-Of-Impingement using the results of the source testing program and air dispersion calculations;
(b) Assess any statistically significant changes in emissions from the cement kiln stack and POI concentrations of the test contaminants resulting from the use of alternative fuel, if any, relative to the baseline conditions; and
(c) Assess any statistically significant changes in ambient air concentrations resulting from the use of alternative fuel, if any, relative to the baseline conditions.

There were three main components to the project:

(1) Raw feed and conventional fuel sampling program which consisted of testing of metals and total halogens;
(2) Kiln stack testing program which consisted of testing and modelling of an extensive suite of compounds including particulate matter, metals, polycyclic aromatic hydrocarbons (PAHs), dioxins and furans (D&Fs), hydrogen chloride (HCl), ammonia (NH_3); and volatile organic compounds (VOCs). Continuous emission monitoring was also undertaken for nitrogen oxides (NOx), sulphur dioxide (SO_2) and carbon monoxide (CO); and

(3) Ambient air monitoring program which consisted of testing of an extensive suite of compounds including metals, PAHs, D&Fs, and VOCs.

All three components were conducted under three separate operating conditions: (i) baseline (ii) alternative fuel substitution and (iii) post- baseline. All components were successfully completed according to pre-approved protocol and every effort was made to ensure accuracy throughout the project.

A maximum alternative fuel consumption rate of approximately 12 tonnes per hour was achieved during the demonstration project.

The raw feed and conventional fuel sampling program demonstrated that the input (metals and total halogens) into the system from raw feed and conventional fuel was generally consistent across all operating conditions. Raw feed analysis conducted by SMC indicated the total sulphur input in the system was also consistent.

The SMC plant fully complied with their Operational Limits, their Performance Objectives, and with Reg 419 while firing any amount of alternative fuel.

The data obtained from the source testing program demonstrated that, with the exception of SO_2 and HCl, there was no statistically significant difference in kiln stack emissions and POI concentrations of all contaminants as a result of the use of alternative fuel, relative to baseline conditions.

With respect to SO_2, since the sulphur content in the raw feed was consistent under all operating conditions and the sulphur content in the alternative fuel was significantly less than in the conventional fuel, the change in SO_2 emissions and POI concentrations is expected to be a result of fluctuations in kiln operating conditions rather than a function of either raw feed or fuel (conventional and/or alternative fuel).

With respect to HCl, an analysis of chlorine content in the raw feed, conventional fuel and alternative fuel indicates that the emission rate is more closely related to the chlorine content in raw feed than in fuel. A review of SMC's historical source testing data for HCl confirms that the emission rates for HCl under all operating conditions are within the normal range.

Notably the maximum POI concentrations for SO_2 and HCl for all operating conditions remained below and well below the POI limits, respectively.

The data obtained from the ambient monitoring program demonstrated that there was no statistically significant difference in ambient air concentrations of any contaminant as a result of the use of alternative fuel, relative to baseline conditions.

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1.0 INTRODUCTION AND BACKGROUND

In November 2014, St Marys Cement Inc. (Canada) [SMC] received approval from the Ontario Ministry of the Environment, Conservation and Parks (Ministry) to undertake a time-limited demonstration project at their cement plant located at 400 Bowmanville Avenue, in Bowmanville, Ontario (Facility) to gather site-specific air quality data when the Facility's conventional fuel, is substituted with up to 12 tonnes of the alternative fuels as specified in their environmental approvals.

The test is governed by two Environmental Compliance Approvals (ECAs): ECA (Waste Disposal Site) Number 1255-7QVJ2N, dated March 11th, 2015 including Notice No.1 dated March 17th, 2017 and No.2 dated October 17th, 2017 and ECA (Air) Number 4614-826K9W, dated November 5th, 2014.

SMC submitted the Pre-Test Plan to the Ministry on August 30th, 2018. The Pre-test plan was approved on September 18th, 2018. SMC subsequently conducted an alternative fuel demonstration project at their Facility, from September 30th, 2018 to October 2nd, 2018, from October 10th to 12th, 2018 and from December 4th, 2018 to December 8th, 2018. These dates reflect the actual source testing days.

At the completion of the project, each approval requires that SMC provide a detailed report. With respect to the ECA (Waste Disposal Site), a report entitled "*St. Marys Alternative Fuel Demonstration Project: Waste Report (May 2019)*" was prepared by HDR Inc. (HDR) and was submitted to the Ministry. The report concluded that the demonstration project met the requirements of the ECA (Waste Disposal Site) and that there were no significant operational or environmental problems that could cause an adverse environmental impact during the project.

This report addresses the reporting requirements set out in the ECA (Air) and, in particular, Condition 9 – Reporting, which, in turn, references specific requirements under Section B of Schedule "C" in the approval (attached as Appendix A).

1.1 Purpose and Scope of the Alternative Fuel Demonstration Project

The purpose of the alternative fuel demonstration project was to demonstrate that utilizing alternative fuel as described in the air ECA to offset a portion of conventional fuel is acceptable in regard to operational and environmental requirements.

The purpose of the air component of the alternative fuel demonstration project was to:

(a) Demonstrate compliance with Regulation 419/05 (Reg 419) Schedule 3 standards at the maximum Point-Of-Impingement (POI) using the results of the source testing program and air dispersion calculations;
(b) Assess any statistically significant changes in emissions from the cement kiln stack and POI concentrations of the test contaminants resulting from the use of alternative fuel, if any, relative to the baseline conditions; and

(c) Assess any statistically significant changes in ambient air concentrations resulting from the use of alternative fuel, if any, relative to the baseline conditions.

There were three main components:

(1) Raw feed and conventional fuel sampling program;

The purpose of the raw feed and conventional fuel sampling program was to ensure that the input into the system was consistent so that the effect of introducing alternative fuel could be assessed.

(2) Kiln stack testing program including air dispersion modelling of the results;

The purpose of the kiln stack testing program was to measure an extensive suite of compounds identified by the Ministry (see Schedule "B2" of the ECA) to meet Condition 8 of the ECA.

(3) Ambient air monitoring program.

The purpose of the ambient air monitoring program was to measure an extensive suite of compounds identified by the Ministry (see Schedule "B1" of the ECA) to meet Condition 7 of the ECA.

All three programs were conducted under three separate operating conditions:

(i) Baseline;

Baseline source testing was conducted on September 30th, October 1st and October 2nd, 2018. Baseline ambient monitoring ran continuously during the above test dates. Raw feed and conventional fuel samples were taken throughout the baseline source testing period.

(ii) Alternative Fuel Substitution; and

Two trials of alternative fuel source testing were conducted on October 10th, October 12th (Trial 1), and December 4th, December 5th, and December 6th, 2018 (Trial 2). Ambient monitoring when alternative fuel was being used ran continuously from during the above test dates. Raw feed and conventional fuel samples were taken throughout the alternative fuel substitution source testing period.

(iii) Post-baseline;

Post-baseline source testing was conducted on December 7th, and December 8th, 2018. Post-baseline ambient monitoring ran continuously during the above test dates. Raw feed and conventional fuel samples were taken throughout the post-baseline source testing period.

1.2 Overview of the Quantities and Characteristics of the Alternative Fuel Used

The alternative fuel used in Trial 1 consisted of post-composting residual and post-consumer materials from industrial and commercial sources including woody residuals and post-consumer paper and plastic materials unsuitable for recycling.

The alternative fuel used in Trial 2 consisted of woody residuals from post-consumer sources as well as residual plastic material from an industrial source unsuitable for recycling. Modifications to the fuel blend for Trial 2 were discussed and confirmed with the Ministry prior to developing the fuel blend for Trial 2.

A detailed discussion of the alternative fuel properties and of its receipt and use onsite during the alternative fuel demonstration project is provided in the Alternative Fuel Demonstration: Summary Waste Report (April 2019) prepared under separate cover by HDR. The standard fuel parameters compare as follows:

Parameter	Units	Alternative Fuel Used During Demonstration (Average) Demonstration Trial #1	Conventional Fuel Used During Demonstration (Average) Baseline & Demonstration Trial #1
Gross Calorific Value	MJ/kg	18.03	28.48
Total Carbon	%	42.34	68.63
Sulphur	%	0.15	3.34
Halogen	%	0.18	0.1

Parameter	Units	Alternative Fuel Used During Demonstration (Average) Demonstration Trial #2	Conventional Fuel Used During Demonstration (Average) Demonstration Trial #2 & Post-baseline
Gross Calorific Value	MJ/kg	16.47	27.89
Total Carbon	%	39.78	77.76
Sulphur	%	0.23	2.8
Halogen	%	1.36	0.1

In summary:

- A total of 93.62 tonnes of alternative fuel was consumed in the calciner during Trial 1.
- A total of 237 tonnes of alternative fuel was consumed in the calciner during Trial 2.

Alternative fuel was introduced into the calciner burner using a dedicated Schenck fuel feed, conveyor and metering system. The maximum feed rate possible for the system was 12 tonnes per hour. The average fuel substitution rate achieved was 3.72 tonnes per hour for Trial 1 and 8.3 tonnes per hour for Trial 2. A maximum feed rate of 5.48 tonnes per hour and 11.97 tonnes per hour was achieved for Trials 1 and 2, respectively. While some adjustment was necessary to the shred on the fuel and the fuel blend, and while some operational and equipment adjustments were needed for the fuel feed system to ensure steady fuel supply to the calciner burner, overall the system performed very well.

The HDR report determined that the alternative fuel visual screening and inspection protocol were followed during the Trial 1 and Trial 2. The alternative fuel blends developed and used during the demonstration generally met the fuel quality parameters identified by SMC. The exception was in relation to halogen content in the fuel for Trial 2, which on average had a total halogen content of 1.49 % based on variation in the plastic content from the post-industrial fuel source, compared to SMC's operational quality parameter of < 1%.

1.3 Report Structure

The raw feed and conventional fuel sampling program is described in Section 2. The source testing program including operating conditions and assessment of compliance with Reg 419 is presented in Section 3. The ambient air quality monitoring program is presented in Section 4. Per the requirements of the ECA Condition 13 (2), a summary of comments received during the alternative fuel demonstration project are presented in Section 5. Finally, Section 6 provides the overall conclusions for this project.

2.0 RAW FEED AND CONVENTIONAL FUEL SAMPLING PROGRAM

As outlined in Section 1.1, the purpose of the raw feed and conventional fuel sampling program was to ensure that the input into the system was consistent so that the effect of introducing alternative fuel could be assessed. The conventional fuel used under the baseline, alternative fuel substitution and post-baseline operating conditions was 100% coal.

Per Condition 5 of the ECA, samples were taken on source testing days (i.e. September 30th, October 1st, 2nd, 10th, and 12th, December 4th, 5th, 6th, 7th, and 8th, 2018). Samples of each material were taken three times per test. The sampling methodology and locations are presented in Appendix B-1.

Daily samples were composited according to the sample compositing methodology presented in Appendix B-2. Samples were then submitted to Maxxam Analytics (Maxxam) for metals (including mercury) and total halogens analyses.

The hourly feed rate of the raw feed and conventional fuel during the demonstration project is presented in Appendix D-1.

2.1 Results

Details of the raw feed and conventional fuel sampling program are presented in Appendix B-3 (Raw Feed and Conventional Fuel Sampling Logs). A minimum of three samples were collected at each sampling location each day. Due to the nature of the fuel mill, only either calciner or kiln fuel could be collected at one time. Therefore, some days (as marked on the sampling logs in Appendix B-3) do not have three samples from both the calciner and the kiln. Both the calciner and the kiln used the same fuel.

The analytical results for each daily composite sample were averaged for each operating condition (i.e. Baseline, Alternative Fuel Substitution and Post-Baseline) and compared as presented in Appendix B-4 (Raw Feed and Conventional Fuel Analysis).

There was no significant difference in composition of raw feed between the baseline, alternative fuel substitution and post-baseline conditions. With respect to conventional fuel for the kiln and calciner, there was also no significant difference in composition of conventional fuel between the baseline, alternative fuel substitution and post-baseline conditions.

The raw feed and conventional fuel sampling program, therefore, demonstrated that the input into the system from raw feed and conventional fuel was consistent across all operating conditions.

3.0 SOURCE TESTING PROGRAM

The following section addresses the requirements set out in Schedule "C", Part B(1) of the ECA - Reporting Procedures, Source Testing Program. This section includes a summary of the source testing completed, reference to the records of operating conditions including SMC's continuous emission monitoring (CEM) systems and an assessment of compliance with the Cement Kiln Exhaust Stack Operating Limits set out in Schedule "A1" of the ECA. In addition, this section provides an assessment of compliance with Reg. 419 Schedule 3 standards and a discussion of any statistically significant changes in emissions from the kiln stack and POI concentrations resulting from the use of alternative fuel, if any, relative to baseline conditions.

3.1 Summary of Source Testing

RWDI AIR Inc. (RWDI) was retained by SMC to conduct emission sampling on the kiln exhaust at their facility in Bowmanville, Ontario. The complete report from RWDI is presented in Appendix C.

The purpose of this stack testing program was to satisfy Condition 8 of the ECA. The Pre-Test Plan for this testing program was submitted to the Ontario Ministry of the Environment, Conservation and Parks (Ministry) on August 30th, 2018 per Schedule "C", Part A, 1-4. Approval for the testing program was granted by the Ministry on September 18th, 2018.

Per the Pre-test Plan, triplicate samples were taken under the baseline and alternative fuel substitution conditions. The sample dates are summarized in Table 3-1 below. All testing was undertaken under normal operating conditions as discussed in Section 3.2. Details of the frequency and duration of the source tests are provided in the sample log tables in the RWDI Stack Test Report.

Table 3-1: Source Testing Schedule

Condition	Test No.	Date
Baseline	1	September 30th, 2018
	2	October 1st, 2018
	3	October 2nd, 2018
Alternative Fuel Substitution (Trial 1)	1	October 10th, 2018
	2	October 12th, 2018
	3	October 12th, 2018
Alternative Fuel Substitution (Trial 2)	1	December 4th, 2018
	2	December 5th, 2018
	3	December 6th, 2018
Post-baseline	1	December 7th, 2018
	2	December 7th, 2018
	3	December 8th, 2018

Source testing was undertaken for an extensive suite of compounds (detailed in Schedule "B2" of the ECA) including:

- Total Particulate Matter (TPM), PM_{10}, $PM_{2.5}$ and Metals;
- Polycyclic Aromatic Hydrocarbons (PAHs), Dioxins and Furans, and Dioxin-like PCBs (D&Fs);
- Hydrogen Chloride (HCl) and Ammonia (NH_3); and
- Volatile Organic Compounds (VOCs) including chlorinated organics.

The source testing results for all tested contaminants under the baseline, alternative fuel substitution and post-baseline operating conditions are presented in Tables section of the RWDI stack test report (Appendix C).

In addition, continuous emission monitoring (CEM) was undertaken for nitrogen oxides (NOx), sulphur dioxide (SO_2), carbon monoxide (CO), oxygen (O_2), carbon dioxide (CO_2) and opacity. SMC's CEM system was used to monitor NOx and SO_2 emissions and opacity as shown in Appendix D-2. The remaining CEM parameters were tested by RWDI as presented in the Tables section of their stack test report (Appendix C).

The CEM for NOx and SO_2 complied with the requirements of Reg 194/05, EPA – "Industry Emissions – Nitrogen Oxides and Sulphur Dioxide". The CEM for opacity complied with the requirements outlined in Schedule "D" of the ECA. These CEM systems were fully operational throughout the demonstration project as per Condition 6 of the ECA.

3.2 Assessment of Compliance with Cement Kiln Exhaust Stack Operational Limits and Performance Objectives

3.2.1 Operational Limits

The operating conditions during the alternative fuel demonstration project were recorded by the SMC's automated real-time data management system (OSI-PI™).

Per Schedule "A1" of the ECA (Operational Limits), the operating parameters as outlined in Table 3-2 were recorded and compared to their operational limits. This data is presented in Appendix D-1.

Table 3-2: Parameters with Operational Limits while Firing Any Amount of Alternative Fuel

Parameter	Operational Limit
Hourly Raw Material Feed Rate (tonne/hr)	>250 tonne/hr
Quantity of Alternative Fuel	No more than 12 tonnes/hr
Temperature	>1000 °C at a residence time of more than 6 seconds in the kiln

	>850 °C at a residence time of more than 3 seconds in the calciner
Residual Oxygen (%)	>1% at the backend of the kiln >3% Residual oxygen at the calciner down comer duct
Pressure Control	Kiln must be operated under negative pressure
Start-up, Shut-down or Upset Operating Conditions	No alternative fuel to be used

In addition, Condition 5(2) of the ECA also requires SMC to record hourly feed rate of the conventional fuel. This data is presented in Appendix D-1.

As shown in Appendix D-1, all parameters met their operational limits while firing any amount of alternative fuel in the kiln.

3.2.2 Performance Objectives

Per Schedule "A2" of the ECA (Performance Objectives), SMC met the performance objectives as outlined in Schedule "A2" of the ECA under all operating conditions as summarized in Table 3-3.

Table 3-3: Performance Objective Table, Averaged Results

Parameter	Units	Emission Limit	Baseline	Alternative Fuel Trial 1	Alternative Fuel Trial 2	Post-baseline
			Concentration			
Particulate Matter	mg/Rm^3	50	12.4	8.2	19	20
Dioxins and Furans	pg $ITEQ/Rm^3$	80	16.6	20	8.7	9.5
Hydrochloric Acid (HCl)	mg/Rm^3	27	8.8	6.1	7.6	3.0
Cadmium	$\mu g/Rm^3$	7	0.192	0.3	0.14	0.16
Lead	$\mu g/Rm^3$	60	7.25	5.3	1.4	0.89
Mercury	$\mu g/Rm^3$	20	2.46	1.5	1.4	0.86

3.3 Assessment of Compliance with Reg 419

As per Schedule "C" B.1(5) of the ECA, an assessment of compliance with Reg 419 Schedule 3 POI standards was undertaken when the kiln was operating under the maximum alternative fuel substitution rate. This assessment used the site-specific source testing data collected on December 4th to 6th, 2018[1].

[1] The October 10th and 12th, 2018 Alternative Fuel source test did not attain the maximum alternative fuel substitution rate.

In addition, in order to compare the baseline operating condition (i.e. no alternative fuel) to the alternative fuel operating condition (as required by Schedule "C" B.1(6) of the ECA), the maximum POI concentrations for the baseline/post-baseline operating condition were also determined.

3.3.1 Maximum Emissions Scenario

For assessing compliance with Reg 419, the maximum emissions scenario conservatively assumed that all sources including the kiln stack operated at their respective maximum capacities, 24 hour per day, 365 days per year as set out in the SMC's current Emission Summary and Air Dispersion Modelling (ESDM) Report.

For contaminants emitted from the kiln stack, the average emission rate, kiln stack flow and temperature of the three individual source tests under each condition was modelled. Where the results were below the detection limit (i.e. the lowest amount of a contaminant that can be quantified by the analytical laboratory), the full detection limit was conservatively assumed.

The summary of kiln stack emissions is presented in Appendix E-1.

3.3.2 Identification of Significant Contaminants for the Purpose of Assessing Compliance with Reg 419

For the purpose of this compliance assessment, all contaminants that are potentially emitted from more than one source including the kiln stack (i.e. particulate, some metals and combustion gases) and/or all contaminants that have a standard other than 1-hour or 24-hour were considered significant.

For contaminants that are emitted from the kiln stack only and that have an hourly and/or 24-hour standard, an assessment of significance was undertaken using the Ministry's methodology presented in Section 7.1.2 of their Procedure for Preparing an ESDM Report, dated March 2018. The assessment conservatively used the highest emission rate from the three operating conditions as described in Appendix E-2.

Using this methodology, all contaminants with 1-hour limits were determined to be negligible. With respect to contaminants with 24-hour limits, 85 of 123 contaminants were determined to be negligible. This result is expected as many compounds are either below their detection limits for all tests or are very close to their detection limits when detected.

3.3.3 Air Dispersion Modelling

Air dispersion modelling for all significant contaminants was undertaken for all three operating conditions using the US EPA AERMOD modelling system (AERMOD Version 16216r) and site-specific meteorological data provided by the Ministry. Details of the modelling set up are summarized in Appendix E-3.

The maximum Point-of-Impingement (POI) concentrations for each contaminant for each applicable averaging period are presented in Table 3-4. As presented in Table 3-4, the maximum

POI concentration for each significant contaminant under all operating conditions is below its respective POI limit as set out in Schedule 3 of Reg 419, Ontario POI guidelines and Jurisdictional Screening Levels (JSLs).

With the exception of combustion gases and particulate matter, the maximum POI concentrations of all contaminants are well below (<20%) their respective Ministry limits under all operating conditions.

The facility, therefore, fully complied with Reg 419 under the maximum alternative fuel substitution condition.

Table 3-4: Emission Summary Table

Contaminant Name	CAS #	Total Facility Emission Rate (g/s)			Air Dispersion Model Used	Maximum POI Concentration (ug/m^3)			Averaging Period Emission Rate	Averaging Period POI Concentration	Ministry POI Limit (µg/m^3)	Limiting Effect	Regulation Schedule #	Percentage of Ministry POI Limit (%)		
		Baseline (Oct 2018)	Alt Fuel (Dec 2018)	Post Baseline (Dec 2018)		Baseline (Oct 2018)	Alt Fuel (Dec 2018)	Post Baseline (Dec 2018)						Baseline (Oct 2018)	Alt Fuel (Dec 2018)	Post Baseline (Dec 2018)
PM	PM	7.94E+00	1.01E+01	1.00E+01	AERMOD	6.73E+01	6.73E+01	6.73E+01	24 hr	24 hr	120	Visibility	Standard	56.1%	56.1%	56.1%
Nitrogen Oxides	10102-44-0	8.95E+01	8.69E+01	9.74E+01	AERMOD	2.76E+02	2.61E+02	2.91E+02	1 hr	1 hr	400	Health	Standard	69.0%	65.3%	72.8%
Nitrogen Oxides	10102-44-0	8.95E+01	8.69E+01	9.74E+01	AERMOD	1.17E+02	1.11E+02	1.19E+02	24 hr	24 hr	200	Health	Standard	58.3%	55.3%	59.3%
Sulphur Dioxide	7446-09-5	1.37E+02	1.69E+02	1.14E+02	AERMOD	4.22E+02	5.09E+02	3.41E+02	1 hr	1 hr	690	Health & Vegetation	Standard	61.2%	73.7%	49.4%
Sulphur Dioxide	7446-09-5	1.37E+02	1.69E+02	1.14E+02	AERMOD	1.78E+02	2.15E+02	1.38E+02	24 hr	24 hr	275	Health & Vegetation	Standard	64.8%	78.2%	50.3%
CO	630-08-0	1.19E+02	1.00E+02	7.49E+01	AERMOD	3.24E+02	3.12E+02	2.38E+02	1 hr	0.5 hr	600	Health	Standard	54.0%	52.0%	39.7%
Ammonia	7664-41-7	5.95E+00	5.22E+00	4.06E+00	AERMOD	8.24E+00	7.23E+00	5.62E+00	24 hr	24 hr	100	Health	Standard	8.2%	7.2%	5.6%
Hydrochloric Acid	7647-01-0	1.45E+00	1.67E+00	6.03E-01	AERMOD	1.45E+00	2.31E+00	8.35E-01	24 hr	24 hr	20	Health	Standard	7.2%	11.6%	4.2%
Aluminum	7429-90-5	6.07E-02	2.11E-02	1.47E-02	AERMOD	8.41E-02	2.92E-02	2.04E-02	24 hr	24 hr	12	Health	SL-JSL	0.7%	0.2%	0.2%
Aluminum Oxide	1344-28-1	1.15E-01	3.99E-02	2.78E-02	AERMOD	1.59E-01	5.52E-02	3.85E-02	24 hr	24 hr	120	Particulate	Guideline	0.1%	0.0%	0.0%
Antimony	7440-36-0	6.00E-04	6.71E-04	6.90E-04	AERMOD	1.73E-03	1.73E-03	1.73E-03	24 hr	24 hr	25	Health	Standard	0.0%	0.0%	0.0%
Arsenic	7440-38-2	2.13E-04	2.09E-04	2.14E-04	AERMOD	1.43E-03	9.60E-04	9.60E-04	24 hr	24 hr	0.3	Health	Guideline	0.5%	0.3%	0.3%
Barium	7440-39-3	4.00E-03	4.13E-03	3.89E-03	AERMOD	2.52E-02	2.52E-02	2.52E-02	24 hr	24 hr	10	Health	Guideline	0.3%	0.3%	0.3%
Beryllium	7440-41-7	3.09E-05	3.47E-05	3.63E-05	AERMOD	6.00E-05	6.00E-05	6.00E-05	24 hr	24 hr	0.01	Health	Standard	0.6%	0.6%	0.6%
Cadmium	7440-43-9	4.30E-05	4.15E-05	4.35E-05	AERMOD	1.50E-04	1.50E-04	1.50E-04	24 hr	24 hr	0.025	Health	Standard	0.6%	0.6%	0.6%
Calcium Oxide	1305-78-8	9.69E-01	2.20E-01	1.16E-01	AERMOD	1.34E+00	3.05E-01	1.61E-01	24 hr	24 hr	10	Corrosion	Standard	13.4%	3.0%	1.6%
Chromium	7440-47-3	1.01E-03	9.87E-04	1.01E-03	AERMOD	6.25E-03	6.25E-03	6.25E-03	24 hr	24 hr	0.5	Health	Standard	1.3%	1.3%	1.3%
Cobalt	7440-48-4	3.46E-04	1.75E-04	1.73E-04	AERMOD	2.49E-03	2.49E-03	2.49E-03	24 hr	24 hr	0.1	Health	Guideline	2.5%	2.5%	2.5%
Iron	7439-89-6	4.56E-02	2.36E-02	1.69E-02	AERMOD	6.32E-02	3.27E-02	2.34E-02	24 hr	24 hr	4	Health	Standard	1.6%	0.8%	0.6%
Ferric Oxide	1309-37-1	5.42E-01	4.79E-01	4.60E-01	AERMOD	4.78E+00	4.78E+00	4.78E+00	24 hr	24 hr	25	Soiling	Standard	19.1%	19.1%	19.1%
Lead	7439-92-1	1.62E-03	7.30E-04	6.10E-04	AERMOD	5.19E-03	5.19E-03	5.19E-03	24 hr	24 hr	0.5	Health	Standard	1.0%	1.0%	1.0%
Lead	7439-92-1	1.62E-03	7.30E-04	6.10E-04	AERMOD	2.00E-03	2.00E-03	2.00E-03	24 hr	30 day	0.2	Health	Standard	1.0%	1.0%	1.0%
Manganese	7439-96-5	9.90E-03	1.06E-02	8.74E-03	AERMOD	1.11E-01	1.11E-01	1.11E-01	24 hr	24 hr	0.4	Health	Standard	27.8%	27.8%	27.8%
Mercury	7439-97-6	4.21E-04	3.24E-04	1.91E-04	AERMOD	6.10E-04	4.80E-04	3.00E-04	24 hr	24 hr	2	Health	Standard	0.0%	0.02%	0.0%
Nickel	7440-02-0	3.85E-03	3.74E-03	3.65E-03	AERMOD	6.29E-02	6.29E-03	6.29E-02	24 hr	24 hr	2	Health	URT/DAV	3.1%	0.3%	3.1%
Nickel	7440-02-0	3.85E-03	3.74E-03	3.65E-03	AERMOD	7.07E-03	7.07E-03	7.07E-03	24 hr	Annual	0.4	Health	AAV	1.8%	1.8%	1.8%
Nickel	7440-02-0	3.85E-03	3.74E-03	3.65E-03	AERMOD	7.07E-03	7.07E-03	7.07E-03	Annual	Annual	0.04	Health	Standard	17.7%	17.7%	17.7%
Phosphorus	7723-14-0	1.34E-02	1.55E-02	1.61E-02	AERMOD	1.86E-02	2.15E-02	2.23E-02	24 hr	24 hr	0.5	Health	SL-MD	3.7%	4.3%	4.5%
Potassium	7440-09-7	1.07E-01	2.66E-02	2.10E-02	AERMOD	1.48E-01	3.69E-02	2.91E-02	24 hr	24 hr	1	Health	SL-JSL	14.8%	3.7%	2.9%
Selenium	7782-49-2	3.27E-04	3.74E-04	3.87E-04	AERMOD	5.10E-04	5.70E-04	6.00E-04	24 hr	24 hr	10	Health	Guideline	0.01%	0.01%	0.01%
Silver	7440-22-4	4.01E-04	8.69E-05	9.09E-05	AERMOD	6.10E-04	4.60E-04	4.60E-04	24 hr	24 hr	1	Health	Standard	0.1%	0.05%	0.05%
Tin	7440-31-5	8.56E-03	3.49E-03	3.05E-03	AERMOD	1.19E-02	4.95E-03	4.40E-03	24 hr	24 hr	10	Health	Standard	0.1%	0.05%	0.04%
Vanadium	7440-62-2	6.14E-04	6.13E-04	6.17E-04	AERMOD	8.59E-03	8.59E-03	8.59E-03	24 hr	24 hr	2	Health	Standard	0.4%	0.4%	0.4%
Benzene	71-43-2	2.44E-01	2.48E-01	2.77E-01	AERMOD	3.38E-01	3.44E-01	3.84E-01	24 hr	24 hr	100	Health	URT/DAV	0.3%	0.3%	0.4%
Benzene	71-43-2	2.44E-01	2.48E-01	2.77E-01	AERMOD	6.47E-03	6.58E-03	7.35E-03	24 hr	Annual	4.5	Health	AAV	0.1%	0.1%	0.2%
Benzene	71-43-2	2.44E-01	2.48E-01	2.77E-01	AERMOD	6.47E-03	6.58E-03	7.35E-03	Annual	Annual	0.45	Health	Standard	1.4%	1.5%	1.6%
Ethylbenzene	100-41-4	3.23E-02	3.73E-02	3.98E-02	AERMOD	1.61E-01	1.86E-01	1.98E-01	1 hr	10 min	1900	Odour	Guideline	0.0%	0.0%	0.0%
1,1,2,2-Tetrachloroethane	79-34-5	2.11E-04	1.99E-04	2.00E-04	AERMOD	2.92E-04	2.76E-04	2.77E-04	24 hr	24 hr	0.1	Health	SL-JSL	0.3%	0.3%	0.3%
1,1,2-Trichloroethane	79-00-5	2.41E-04	2.27E-04	2.28E-04	AERMOD	3.34E-04	3.14E-04	3.16E-04	24 hr	24 hr	0.3	Health	SL-JSL	0.1%	0.1%	0.1%
Xylene	1330-20-7	1.71E-01	2.17E-01	2.58E-01	AERMOD	8.54E-01	1.08E+00	1.29E+00	1 hr	10 min	3000	Odour	Guideline	0.0%	0.0%	0.0%
Benzo(a)pyrene	50-32-8	2.18E-05	2.17E-05	2.17E-05	AERMOD	3.01E-05	3.01E-05	3.01E-05	24 hr	24 hr	0.005	Health	URT/DAV	0.6%	0.6%	0.6%
Benzo(a)pyrene	50-32-8	2.18E-05	2.17E-05	2.17E-05	AERMOD	5.77E-07	5.75E-07	5.75E-07	24 hr	Annual	0.0001	Health	AAV	0.6%	0.6%	0.6%
Benzo(a)pyrene	50-32-8	2.18E-05	2.17E-05	2.17E-05	AERMOD	5.77E-07	5.75E-07	5.75E-07	Annual	Annual	0.00001	Health	Standard	5.8%	5.8%	5.8%
Naphthalene	91-20-3	5.42E-02	4.94E-02	4.75E-02	AERMOD	7.51E-02	6.84E-02	6.58E-02	24 hr	24 hr	22.5	Health	Guideline	0.3%	0.3%	0.3%
Naphthalene	91-20-3	5.42E-02	4.94E-02	4.75E-02	AERMOD	1.11E-01	1.01E-01	9.70E-02	24 hr	10 min	50	Odour	Guideline	0.2%	0.2%	0.2%
Hexachlorobenzene	118-74-1	2.18E-05	2.17E-05	2.17E-05	AERMOD	3.01E-05	3.01E-05	3.01E-05	24 hr	24 hr	0.011	Health	SL-JSL	0.3%	0.3%	0.3%

- Indicates that kiln stack concentration was below detection limit. The detection limit was used to calculate the kiln stack emission rate.

SL-JSL - Jurisdictional Screening Level; SL-MD - Ministry-derived Screening Level; URT - Upper Risk Threshold; AAV - Annual Assessment Values; DAV - Daily Assessment Values

3.4 Comparison between Alternative Fuel and Baseline Results

As per Schedule "C" B.1(6) of the ECA, a description and explanation is required of any statistically significant changes in emissions from the kiln stack and POI concentrations of the test contaminants, if any, resulting from the use of alternative fuel, relative to baseline condition.

3.4.1 Methodology

The procedure for determining statistically significant change is divided into five screening steps as described below.

Step 1: Determination of Contaminants for which Change can be Assessed

In order to assess statistically significant changes, it is first necessary to identify contaminants for which change can be assessed. For those contaminants whose measured stack concentrations are essentially at or below the detection limit under all operating conditions, statistically significant changes cannot be assessed and, therefore, are deemed negligible. As summarized in Appendix F, 66 out of 145 contaminants are essentially at or below their detection limits under all operating conditions.

Step 2: Determination of Contaminants that have an Emission Rate outside the Baseline Normal Range

If the emission rate of a contaminant for the alternative fuel test is within the emission rate range for baseline/post-baseline, no statistically significant changes are expected as a result of the use of alternative fuels for this contaminant. As summarized in Appendix F, 54 out of 79 contaminants have an emission rate during the alternative fuel test that is within the baseline/post-baseline range.

Step 3: Determination of Contaminants that are Emitted in Significant Amounts Using the Ministry Emission Threshold Screening Procedure

For contaminants that are emitted from more than one source (e.g. the kiln stack) and/or have a POI limit that is not 1-hour or 24-hour, emissions of these contaminants require further analysis (see Step 4).

For contaminants that are only emitted from the kiln stack and have a POI limit that is 1-hour or 24-hour, the Ministry's emission threshold screening procedure outlined in Section 7.1.2 and Appendix B.1 of the Ministry's Procedure for Preparing an ESDM Report, March 2019 (see Appendix E-2 of this report) was used to screen out contaminants with negligible emissions.

As summarized in Appendix F, 12 contaminants have an emission rate that is considered negligible using the emission threshold screening procedure.

Step 4: Determination of Contaminants that are Emitted in Significant Amounts Using AERMOD Dispersion Modelling

For contaminants with significant emissions determined through Step 3, AERMOD modelling was performed for 14 contaminants under all operating conditions. If the maximum POI concentration of the contaminant for all operating conditions is less than 1% of the application Ministry limit(s), the emissions of that contaminant are deemed negligible.

PM_{10} and $PM_{2.5}$ do not have POI limits. For the purpose of assessing statistically significant change, the AERMOD modelling results were compared to the 24-hour interim Ambient Air Quality Criteria (AAQC) and the 24-hour and annual Canadian Ambient Air Quality Criteria for PM_{10} and $PM_{2.5}$, respectively.

As summarized in Appendix F, 3 contaminants have an emission rate that is considered negligible based on the modelling results.

Step 5: Determination of Contaminants that Have a Maximum POI Concentration Change Greater than 1%

If the difference in percentage of the POI limit for alternative fuel substitution is less than 1% of the baseline range, the emissions of that contaminant are deemed negligible.

As summarized in Appendix F, 1 contaminant has an emission rate that is considered negligible.

3.4.2 Explanation of Statistically Significant Changes

The assessment of statistically significant changes using the methodology above identified three contaminants, NOx, SO_2 and HCl requiring further analysis.

<u>Nitrogen Oxides</u>

The kiln stack emissions and maximum POI concentrations of NOx were lower during the use of alternative fuel than during baseline/post-baseline. NOx is a product of thermal combustion and is dependant upon process related factors such as temperature and oxygen level.

Since the total heat input for the kiln system was generally consistent, the reduction in NOx emissions and POI concentrations during the use of alternative fuels is not deemed a statistically significant change.

<u>Sulphur Dioxide</u>

Emissions and maximum POI concentrations of SO_2 were higher during the use of alternative fuel than during baseline/post-baseline. Since the sulphur content in the raw feed was consistent under all operating conditions and the sulphur content in the alternative fuel was significantly less than in the conventional fuel, the change in SO_2 emissions and POI concentrations is expected to be a result of fluctuations in kiln operating conditions rather than a function of either raw feed or fuel (conventional and/or alternative fuel).

Notably the maximum POI concentrations of this contaminant for all operating conditions remain below the POI limit.

Hydrogen Chloride

Emissions and maximum POI concentrations of HCl were higher during the use of alternative fuel than during baseline/post-baseline. An analysis of chlorine content in the raw feed, conventional fuel and alternative fuel indicates that the emission rate is more closely related to the chlorine content in raw feed than in fuel. A review of SMC's historical source testing data for HCl confirms that the emission rates for HCl under all operating conditions are within the normal range.

Notably the maximum POI concentrations of this contaminant for all operating conditions remain well below the POI limit.

Summary

The data shows no statistically significant change in kiln stack emissions and POI concentrations for any contaminants as a result of the use of alternative fuel, relative to baseline conditions.

4.0 AMBIENT AIR MONITORING PROGRAM

The following section addresses the requirements set out in Schedule "C", Part B(2) of the ECA - Reporting Procedures, Ambient Air Monitoring Program. This section includes a summary of the ambient monitoring completed, including information on the location of the samplers, the specifications of the samplers, sampling schedules, and the specifications of the meteorological stations used to monitor meteorological conditions. In addition, this section provides a discussion of any statistically significant changes in ambient air concentrations of the test contaminants, if any, resulting from the use of alternative fuel, relative to baseline conditions.

The results of the raw feed and conventional fuel sampling program and records of kiln operating conditions are provided in Sections 2 and 3.2.1, respectively.

4.1 Summary of Ambient Monitoring

RWDI was retained by SMC to conduct ambient air monitoring in the vicinity of the Bowmanville Facility. The complete report is presented in Appendix G.

The purpose of the ambient air monitoring program was to satisfy Condition 7 of the ECA. A pre-test plan for this monitoring program was submitted to the Ministry on August 30th, 2018 along with the pre-test plan for the source testing program.

Ambient monitoring took place throughout the use of alternative fuel in October and December 2018, and on the days of the baseline and post-baseline source tests as shown in Table 3-1.

The locations of the ambient monitoring stations (see Figure 1 of Appendix G) were determined through a combination of air dispersion modelling (Appendix H-1) and consultation with SMC based on the locations of existing ambient/meteorological stations, access and power. Actual monitoring locations (OPG Station and Beach Station) correlated well with the optimum locations (Primary and Secondary Downwind Stations). The Cove station in general correlated to background (i.e. not upwind or downwind).

Ambient monitoring was undertaken for an extensive suite of compounds (detailed in Schedule "B1" of the ECA) including:

- Metals including gaseous mercury;
- Polycyclic Aromatic Hydrocarbons (PAHs) and Dioxins and Furans (D&Fs); and
- Volatile Organic Compounds (VOCs).

For each location/contaminant combination, approximately 24-hour long separate tests were completed following US EPA "compliance quality" procedures. A description of the specifications of the monitors used in the ambient program is provided in Section 2 of Appendix G.

4.2 Meteorological Data

4.2.1 Description of the Specifications of Meteorological Stations Used

Three meteorological stations (OPG, SMC Dock and SMC Cove) were used during the project to determine the relationship between each ambient monitoring station and the kiln stack (i.e. upwind, downwind or background [i.e. neither upwind nor downwind]). A description of the meteorological stations is summarized in Section 2.4 of Appendix G.

4.2.2 Records of Meteorological Conditions and Analysis of Wind Direction

Hourly records of meteorological conditions and daily wind roses for all stations are presented in Appendix B of Appendix G.

Wind directions were used to analyze the relationship between each ambient monitoring station and the kiln stack (i.e. upwind or downwind) during the test periods. The station was determined to be downwind of the kiln stack if the location of the station was within approximately a 45° angle range of the wind direction (blowing from) relative to the kiln stack for each day. The results are provided in Appendix H-2. The weather data collected by the Cove meteorological station suggests that wind patterns were influenced by local terrain features, in particular, the Bowmanville Quarry.

4.3 Ambient Air Monitoring Program Results

A summary of the results by day and station can be found in the Tables section of the RWDI ambient monitoring report attached as Appendix G. The meteorological data from the closet station is used to identify if the ambient stations were upwind, downwind or background, relative to the kiln stack.

4.4 Comparison between Alternative Fuel and Baseline Results

4.4.1 Methodology

The procedure for determining statistically significant change in the ambient results is divided into three steps as described below.

Step 1: Determination of Contaminants for which Change can be Assessed

In order to assess statistically significant changes, it is first necessary to identify contaminants for which change can be assessed. For those contaminants whose measured ambient concentrations are essentially at or below the detection limit under all operating conditions, statistically significant changes cannot be assessed and, therefore, are deemed negligible.

Step 2: Determination of Contaminants that have an Emission Rate outside the Baseline Normal Range

If the ambient concentrations of a contaminant for the upwind and downwind stations are within the ambient concentration range for the background stations, no statistically significant changes are expected as a result of the use of alternative fuels for this contaminant.

Step 3: Determination of Significance of Contaminant Ambient Concentrations Relative to the Ministry Ambient Air Quality Criteria

If the ambient concentrations of a contaminant for all stations under all operating conditions are within 1% of the applicable ambient air quality criteria (AAQCs), no statistically significant changes are expected as a result of the use of alternative fuels for this contaminant.

4.4.2 **Results of Significance Assessment**

Metals

17 out of 27 metals including mercury were below detection for all stations under all operating conditions.

All remaining metals at the upwind and downwind stations were within the background range for under all operating conditions.

Dioxins and Furans (D&Fs)

Most individual D&Fs (congeners) were below detection for all stations under all operating conditions. With respect to the total D&Fs, all ambient measurements for upwind and downwind stations were within the background range.

Polycyclic Aromatic Hydrocarbons (PAHs)

Most PAHs were below detection for all stations under all operating conditions. Naphthalene and benzo(a)pyrene (BaP) which is the surrogate for all PAHs, have AAQCs.

With respect to naphthalene, all ambient measurements were less than 1% of its AAQC for all stations under all operating conditions.

With respect to BaP, ambient measurements for all stations under all operating conditions were below the AAQC with the exception of October 4th, December 4th, 5th, 7th and 8th of 2018. On October 4th, December 7th and 8th, 2019 the measurements were slightly elevated and were all background stations. On December 4th and 5th, 2018, all stations (background, upwind, downwind) were significantly elevated. The downwind station during this period was within the range of the background stations. These elevated ambient levels were a result of generally elevated levels in the Clarington area as verified by reviewing the ambient measurements from the Durham-York Engine Centre ambient monitoring program for the same period.

Volatile Organic Compounds (VOCs)

Most VOCs were below detection for all stations under all operating conditions.

For those contaminants that were detected, all ambient concentrations were either (a) within the concentration range for baseline/post-baseline when alternative fuel was used; or (b) less than 1% of the applicable ambient air quality standard under all three operating conditions.

Summary

In summary, the data shows no statistically significant changes in ambient air concentrations of the test contaminants as a result of the use of alternative fuel, relative to baseline/post-baseline conditions.

5.0 SUMMARY OF COMMENTS RECEIVED DURING THE DEMONSTRATION

Two notices of the Alternative Fuel Demonstration Project were published on SMC's Community Relations webpage on September 19th and 20th, 2018, respectively and the trial was announced at the SMC Community Relationship Committee (CRC) meeting on September 11th, 2018.

No comments from the public, the Ministry or any other party were received regarding the plant operations following the notices, the CRC meeting or during the use of alternative fuels.

One community concern regarding noise was received on October 2nd, 2018, during the baseline period of the alternative fuel trial. The noise concern was related to one of the temporary ambient air monitoring stations. SMC reached out to the community member to clarify that the air monitor station was temporary and confirmed that it would not operate on the Thanksgiving weekend and that SMC would review the unit to see if the noise could be reduced. The community member was satisfied with SMC's response.

One Ministry comment regarding the stolen VOC sample cannister was received on December 6th, 2018. The Ministry advised that the program remained valid, however, the non-VOC ambient monitoring data should be carefully reviewed for this day to appropriately draw conclusions regarding any downwind impacts.

6.0 CONCLUSIONS

A maximum alternative fuel consumption rate of approximately 12 tonnes per hour was achieved during the demonstration project.

The raw feed and conventional fuel sampling program demonstrated that the input (metals and total halogens) into the system from raw feed and conventional fuel was generally consistent across all operating conditions. Raw feed analysis conducted by SMC indicated that the total sulphur input in the system was also consistent.

The SMC plant fully complied with their Operational Limits, their Performance Objectives, and with Reg 419 while firing any amount of alternative fuel.

The data obtained from the source testing program demonstrated that, with the exception of SO_2 and HCl, there was no statistically significant difference in kiln stack emissions and POI concentrations of all contaminants as a result of the use of alternative fuel, relative to baseline conditions.

With respect to SO_2, since the sulphur content in the raw feed was consistent under all operating conditions and the sulphur content in the alternative fuel was significantly less than in the conventional fuel, the change in SO_2 emissions and POI concentrations is expected to be a result of fluctuations in kiln operating conditions rather than a function of either raw feed or fuel (conventional and/or alternative fuel).

With respect to HCl, an analysis of chlorine content in the raw feed, conventional fuel and alternative fuel indicates that the emission rate is more closely related to the chlorine content in raw feed than in fuel. A review of SMC's historical source testing data for HCl confirms that the emission rates for HCl under all operating conditions are within the normal range.

Notably the maximum POI concentrations for SO_2 and HCl for all operating conditions remained below and well below the POI limits, respectively.

The data obtained from the ambient monitoring program demonstrated that there was no statistically significant difference in ambient air concentrations of any contaminant as a result of the use of alternative fuel, relative to baseline conditions.

Appendix A

Environmental Compliance Approval (Air)

Ministry of the Environment, Conservation and Parks
Client Services and Permissions Branch
1st Floor
135 St Clair Ave W
Toronto ON M4V 1P5
Fax: (416) 314-8452
Telephone: (416) 314-8309

Ministère de l'Environnement, de la Protection de la nature et des Parcs
Direction des services à la clientèle et des permissions
135 av St Clair O
Toronto ON M4V 1P5
Télécopieur : (416) 314-8452
Téléphone : (416) 314-8309

Ontario

August 9, 2018

Ruben Plaza, Corporate Environmental Manager
St. Marys Cement Inc. (Canada)
55 Industrial Street
Toronto, Ontario
M4G 3W9

Dear Sir/Madam:

Re: Notification of Change of Address
Reference Number 5607-B3GNAT

The Ministry of the Environment (the "Ministry") acknowledges receipt of your letter dated July 27, 2018 requesting a change in company address:

FROM: St. Marys Cement Inc. (Canada)
410 Waverly Rd R.R. 2
Bowmanville, Ontario
L1C 3K3

TO: St. Marys Cement Inc. (Canada)
Canada Building Materials
55 Industrial St
Toronto, Ontario
M4G 3W9

By this letter, the Ministry advises you that your notification of change in company address has been registered in our records for the following Approval(s):

[Approval(s) – Project type: Air]:

4614-826K9W

The Ministry will not be providing you with an amended approval(s) to reflect the change in company address. Therefore, this letter must be appended to its corresponding approval(s). The address change will be included in any future amended approval(s).

If you have any questions regarding the above, please contact me at the above phone number.

Yours truly,

Florence Poon
Application Processor

cc: District Manager, MECP York-Durham
Chris Sabaziotis, B.Eng., EIT, Environmental Scientist, BCX Environmental Consulting

File Storage Number: 1282

Ontario

Ministry of the Environment
Ministère de l'Environnement

ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER 4614-826K9W
Issue Date: November 5, 2014

St. Marys Cement Inc. (Canada)
410 Waverly Rd R.R. 2
Bowmanville, Ontario
L1C 3K3

Site Location: 400 Waverly Road South
Clarington, Ontario

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, *R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:*

A time-limited Demonstration Project to gather site specific air quality data, where up to 30% of the conventional fuel, based on total energy input, is substituted with the following Alternative Fuels:

Alternative Fuel	Description	Maximum Input Rate (tonnes/hour)
Post-composting plastic polymers and woody residuals.	Shredded and dried plastic film and other plastic materials and woody materials removed from finished compost.	5.5
Plastic polymers, paper fibres and woody residuals derived from industrial and/or post consumer sources.	Shredded plastic and other materials removed from post consumer recycling or from industrial manufacturing process.	6.5

all in accordance with the application for an Approval (Air & Noise), signed by Martin Vroegh and all supporting information, including Emission Summary and Dispersion Modelling Report dated September 29, 2008, prepared by Pottinger Gaherty Environmental Consultants.

For the purpose of this environmental compliance approval, the following definitions apply:

1. "Approval" means this Environmental Compliance Approval, including the application and all supporting documentation;

2. "Alternative Fuel" means plastic polymers, paper fibres and woody residuals derived from industrial and/or post consumer sources, received as single streams, or blends of these material types, classified as Municipal Solid Waste under Ontario Regulation 347, written under the EPA, to be used as a substitute fuel source in the Cement Kiln;

3. "Ambient Air Quality Monitoring Program" means the ambient air quality monitoring program outlined in the report titled "Ambient Air Sampling Program", prepared for St. Marys Cement Inc, by Pottinger Gaherty Environmental Consultants Ltd., July 2008 and Addendum dated December *10, 2008, signed* by Bridget Mills;

4. "Baseline Conditions" means operating conditions where only Conventional Fuel is used in the Cement Kiln;

5. "CEM System" means the continuous monitoring and recording systems used to measure the emissions from the Cement Kiln, as described in the Company's application, this Approval and in the supporting documentation referred to herein, to the extent approved by this Approval;

6. "Company" means St. Marys Cement Inc. (Canada) that is responsible for the construction or operation of the Facility and includes any successors and assigns;

7. "Cement Kiln" means the Cement Kiln, the Calciner and associated control equipment and continuous emissions monitoring systems, firing Conventional Fuel and Alternative Fuel, described in the Company's application, this Approval and in the supporting documentation referred to herein, to the extent approved by this Approval;

8. "Conventional Fuel" means solid fuels such as, petroleum coke and coal;

9. "Demonstration Project" means the demonstration project where up to 30 % of Conventional Fuel is substituted with Alternative Fuel in the Cement Kiln, as described in the Company's application, this Approval and in the supporting documentation referred to herein, to the extent approved by this Approval;

10. "District Manager" means the District Manager of the appropriate local district office of the Ministry, where the Facility is geographically located;

11. "EPA" means the Environmental Protection Act, R.S.O. 1990, c.E.19, as amended;

12. "Equipment" means the equipment and operations associated with the Demonstration Project, located on the property where the Cement Kiln is located, as described in the Company's application, this Approval and in the supporting documentation referred to herein, to the extent approved by this Approval;

13. "Facility" means the entire operation located on the property where the Equipment is located;

14. "Manager" means the Manager, Technology Standards Section, Standards Development Branch, who has been appointed under Section 5 of the EPA for the purposes of Section 11(1)2 of O.Reg. 419, or any other person who represents and carries out the duties of the Manager, Technology Standards Section, Standards Development Branch, as those duties relate to the conditions of this Approval;

15. "Manual" means a document or a set of documents that provide written instructions to staff of the Company;

16. "Ministry" means the ministry of the government of Ontario responsible for the EPA and includes all officials, employees or other persons acting on its behalf;

17. "Point of Impingement" means any point in the natural environment. The point of impingement for the purposes of verifying compliance with the EPA with respect to the Demonstration Project, shall be chosen as the point located outside the Company's property boundaries at which the highest concentration is expected to occur, when that concentration is calculated in accordance with a method accepted by the Director;

18. "Pre-test Information" means the information outlined in Section 1.1 of the Source Testing Code;

19. "Source Testing" means sampling and testing to measure emissions resulting from operating the Cement Kiln at a level of typical maximum production within the approved operating range of the Cement Kiln which satisfies paragraph 1 of subsection 11(1) of O. Reg. 419;

20. "Source Testing Code" means the Source Testing Code, Version 2, Report No. ARB-66-80, dated November 1980, prepared by the Ministry, as amended;

21. "Test Contaminants" means those contaminants set out in Schedules "B1" and "B2" attached to this Approval;

22. "Publication NPC-205" means the Ministry Publication NPC-205, "Sound level Limits for Stationary Sources in Class 1 & 2 Areas (Urban)", October, 1995 as amended; and

23. "Publication NPC-232" means the Ministry Publication NPC-232, "Sound Level Limits for Stationary Sources in Class 3 Areas (Rural)", October, 1995 as amended.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

OPERATION AND MAINTENANCE

1. (1) The Company shall ensure that the Facility is properly operated and maintained at all times while firing any amount of Alternative Fuel in the Cement Kiln during the Demonstration Project, so that operations of the Cement Kiln shall meet the operational limits set out in Schedule "A1". Alternative Fuel is to be stopped (following appropriate procedures) if one or more of Operational Limits is exceeded for more than one consecutive hour.

   (2) The Performance Objectives for emissions from the Cement Kiln Exhaust Stack are set out in Schedule "A2".

2. Unless otherwise approved in writing by the Director due to unforeseen delays in carrying out the Demonstration Project, the Company shall limit the combustion of Alternative Fuel in the Cement Kiln to the following:

   (1) Thirty (30) days for stack testing at the maximum fuel substitution (up to 30%);

   (2) Thirty (30) days for ramping up, stabilization, and ramping down.

3. The Company shall ensure that the Facility is properly operated and maintained at all times during the Demonstration Project. The Company shall:

   (1) prepare and update as necessary, prior to commencement of the Demonstration Project, a Design and Operations Manual specific to all aspects of the Facility, including the handling of Alternative Fuel and the use of Alternative Fuel in the Cement Kiln during the Demonstration Project, outlining the following:

      (a) operating and maintenance procedures in accordance with good engineering practices and as recommended by the equipment suppliers;

      (c) emergency procedures;

      (d) procedures for any record keeping activities relating to the operations of the Facility;

      (e) all appropriate measures to minimize odour, noise and dust emissions from all potential sources from the Facility;

   (2) implement the recommendations of the Design and Operations Manual during the Demonstration Project.

4. The Company shall, at all times, ensure that the noise emissions from the Facility comply with the limits set out in Ministry Publication NPC-205 or Ministry Publication NPC-232, as applicable, during the Demonstration Project.

RAW FEED AND FUELS - ANALYSIS AND MONITORING

5. The Company shall prepare and implement, prior to the firing of Alternative Fuel in the Cement Kiln, a Raw Feed and Fuels Analysis and Monitoring Program to record the properties and quantities of the Raw Feed and Fuels used in the Cement Kiln during the Demonstration Project. The Raw Materials and Fuels Analysis and Monitoring Program shall specify as a minimum:

   (1) sampling methodology and frequency and chemical analysis of raw feed, Conventional Fuel and Alternative Fuel directed to the Cement Kiln;

   (2) hourly feed rate of the raw feed, Conventional Fuel and Alternative Fuel in the Cement Kiln during the Demonstration Project.

MONITORING

CONTINUOUS EMISSIONS MONITORING

6. The Company shall ensure that the existing Continuous Emissions Monitoring Systems, are fully operational during the Demonstration Project, to continuously monitor the following parameters in the exhaust gas stream of the Cement Kiln Exhaust Stack:

   (a) Nitrogen Oxides;
   (b) Sulphur Dioxide;
   (c) Opacity;

   The Continuous Emissions Monitoring Systems for Nitrogen Oxides and Sulphur Dioxide shall comply with the requirements of O. Reg. 194/05, EPA – "Industry Emissions – Nitrogen Oxides and Sulphur Dioxide" . The Continuous Emissions Monitoring System for Opacity shall comply with the requirements outlined in Schedule "D" attached to this Approval.

AMBIENT AIR QUALITY MONITORING

7. The Company shall conduct an Ambient Air Quality Monitoring Program during the Demonstration Project to determine the concentrations of the Test Contaminants listed in Schedule "B1", in accordance with the Ambient Air Quality Monitoring Program. Upwind and downwind sampling locations will be selected based on historical meteorological data and air dispersion modelling of the Cement Kiln stack. Ambient air sampling and monitoring will occur during both Baseline Conditions and with the use of Alternative Fuel in the Cement Kiln.

SOURCE TESTING

8. The Company shall conduct, a Source Testing Program, following the Source Testing Procedures listed in Schedule "C", during the Demonstration Project, to determine the rate of emission of the Test Contaminants listed in Schedule "B2" from the Cement Kiln Exhaust Stack. The Source Testing Program shall be designed to include both the Baseline Conditions and with the use of Alternative Fuel in the Cement Kiln.

REPORTING

9. The Company shall prepare and submit to the Director and District Manager, no later than six (6) months after the completion of the Demonstration Project, a Demonstration Project Summary Report. The Demonstration Project Summary Report shall include, as a minimum, but not limited to:

    (1) a summary of emission data and analysis obtained through the Source Testing Program, the Ambient Air Quality Monitoring Program and the Continuous Emissions Monitoring Program, conducted during the Demonstration Project, prepared in accordance with the requirements of the Reporting Procedures described in Schedule "C" attached to this Approval, as applicable;

    (2) a summary of all comments received by the Company during the Demonstration Project that pertain to the Demonstration Project from the public, the Ministry, or any other party.

10. The Company shall ensure that the above mentioned Demonstration Project Summary Report is made available and easily accessible for review by the public at the Facility and via an internet website, immediately after the document is submitted to the Ministry.

RECORD KEEPING REQUIREMENTS

11. The Company shall retain, for a minimum of five (5) years from the date of their creation and provide to the Ministry, upon request, in a timely manner, all reports, records and information required by this Approval and shall include but not be limited to:

    (1) time, date and duration of the Demonstration Project;

    (2) all records and reports produced from the Raw Feed and Fuels Analysis and Monitoring Program, the Source Testing Program, the Ambient Air Quality Monitoring Program and the Continuous Emissions Monitoring Program required under this Approval;

    (3) all records and reports produced as part of the assessments of emissions and impacts from the operation of the Cement Kiln, as a result of the utilization of Alternative Fuel for the Cement Kiln;

    (4) all records related to all environmental complaints made by the public during the Demonstration Project;

    (5) a copy of the Demonstration Project Summary Report required under Condition 8.

NOTIFICATION

12. The Company shall notify the District Manager, in writing, at least fifteen (15) business days prior to commencement of the Demonstration Project.

COMPLAINTS RESPONSE PROCEDURE

13. If at any time, the Company receives any environmental complaints from the public regarding the operation of the Facility during the Demonstration Project, the Company shall respond to these complaints according to the following procedure:

    (1) The District Manager shall be notified forthwith upon receipt of any complaint;

    (2) Each complaint shall be recorded and numbered, and shall include the following information, as a minimum:

        (a) nature of the complaint;
        (b) weather conditions and wind direction at the time of the complaint;
        (c) name and address of the complainant (if provided); and
        (d) time and date of the complaint;

    (3) Appropriate steps shall be taken forthwith to determine all possible causes of the complaint and to eliminate the cause of the complaint. A written reply shall be provided to the complainant, if known and if requested by the complainant, within 3 business days of receipt of the complaint by the Company.

SCHEDULE "A1"

OPERATIONAL LIMITS

Parameter	Limits	Comments
Quantity of Alternative Fuel	No more than 30% substitution (based on heating value).	Measured continuously.
Raw Material Feed Rate	>250 tonnes/hour	Measured continuously.
Temperature	>1000°C at a residence time of more than 6 seconds in the Kiln >850°C at a residence time of more than 3 seconds in the calciner	Measured by a continuous monitor Calculated as a rolling 1-hour arithmetic average measured by a continuous monitoring system that provides data at least once every 1 minute
Residual oxygen	>1% Residual oxygen at the backend of the kiln. >3% Residual oxygen at the calciner down comer duct.	Measured by a continuous monitor and calculated by volume on a dry basis in the undiluted gases leaving the Kiln. Calculated as a rolling 1-hour arithmetic average measured by a continuous monitoring system that provides data at least once every 1 minute
Pressure Control	Kiln must be operated under negative pressure at all times during the Demonstration Project.	Measured at the top of the preheater towers by continuous monitor.
Start-Up, Shut-down and Upset Operating conditions	No Alternative Fuel to be used.	-

SCHEDULE "A2"

PERFORMANCE OBJECTIVES

Parameter	Emission Limit	Comments
Particulate Matter (PM)	50 mg/Rm^3	calculated as the arithmetic average of three stack tests conducted in accordance with standard methods
Dioxins and Furans	80 pg/Rm^3 as ITEQ	calculated as the arithmetic average of three stack tests conducted in accordance with standard methods
Hydrochloric Acid (HCl)	27 mg/Rm^3	calculated as the arithmetic average of three stack tests conducted in accordance with standard methods
Cadmium	7 ug/Rm3	calculated as the arithmetic average of three stack tests conducted in accordance with standard methods
Lead	60 ug/Rm3	calculated as the arithmetic average of three stack tests conducted in accordance with standard methods
Mercury	20 ug/Rm3	calculated as the arithmetic average of three stack tests conducted in accordance with standard methods

Notes:

R - Reference flue gas conditions, defined as follows:

- Temperature 25 °C
- Pressure 101.3 kPa
- Oxygen content 11%
- Water content nil (dry conditions)

mg/Rm3 - milligrams per cubic metre of gas at Reference conditions.
ug/Rm3 - micrograms per cubic metre of gas at Reference conditions.
pg/Rm3 - picograms per cubic metre of gas at Reference conditions.
I-TEQ - a toxicity equivalent concentration calculated using the toxic equivalency factors (I-TEFs) derived for each dioxin and furan congener by comparing its toxicity to the toxicity of 2,3,7,8 tetrachloro dibenzo-p-dioxin, recommended by the North Atlantic Treaty Organizations's Committee on Challenges to Modern Society [NATO/CCMS] in 1989 and adopted by Canada in 1990.

SCHEDULE "B1"
TEST CONTAMINANTS
Ambient Air Quality Monitoring Program

Metals	Polycyclic Aromatic Hydrocarbons	Dioxins and Furans	Volatile Organic Compounds
Antimony (Sb)	1-Methyl naphthalene	2,3,7,8-Tetrachlorodibenzo-p-dioxin	acetone
Aluminum (Al)	1-Methyl phenanthrene	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	benzene
Arsenic (As)	2-Chloronaphthalene	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	chloromethane
Barium (Ba)	2-Methylanthracene	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	bromomethane
Beryllium (Be)	2-Methylnaphthalene	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	chloroethane
Boron (B)	3-Methylcholanthrene	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	1,1- dichloroethylene (vinyl chloride)
Cadmium (Cd)	7,12-Dimethylbenzo(a)anthracene	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	methylene chloride
Chromium (Cr)	9,10-Dimethylanthracene		1,1- dichloroethane
Cobalt (Co)	Acenaphthene	2,3,7,8-Tetrachlorodibenzofuran	trans - 1,2 -dichloroethylene
Copper (Cu)	Acenaphthylene	2,3,4,7,8-Pentachlorodibenzofuran	cis - 1,2 -dichloroethylene
Lead (Pb)	Anthracene	1,2,3,7,8-Pentachlorodibenzofuran	chloroform
Manganese (Mn)	Benzo(a)anthracene	1,2,3,4,7,8-Hexachlorodibenzofuran	1,2 -dichloroethane
Mercury (Hg)	Benzo(b)fluoranthene	1,2,3,6,7,8-Hexachlorodibenzofuran	2- butanone
Molybdenum (Mo)	Benzo(k)fluoranthene	1,2,3,7,8,9-Hexachlorodibenzofuran	1,1,1 –trichloroethane
Nickel (Ni)	Benzo(a)fluorene	2,3,4,6,7,8-Hexachlorodibenzofuran	carbon tetrachloride
Phosphorus (P)	Benzo(b)fluorene	1,2,3,4,6,7,8-Heptachlorodibenzofuran	1,1,2- trichloroethane
Potassium (K)	Benzo(g,h,i)perylene	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1,2- dichloropropane
Selenium (Se)	Benzo(a)pyrene	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	trichloroethylene
Silver (Ag)	Benzo(e)pyrene		bromodichloromethane
Strontium (Sr)	Chrysene		dibromochloromethane
Thalium (Tl)	Coronene		toluene
Tin (Sn)	Dibenzo(a,e)pyrene		tetrachloroethylene
Titanium (Ti)	Dibenzo(a,h)anthracene		chlorobenzene
Vanadium (V)	Fluoranthene		ethylbenzene
Zinc (Z)	Fluorene		m/p xylene
Calcium Oxide (CaO)	Indeno(1,2,3-cd)pyrene		o - xylene
Iron Oxide (FeO)	Naphthalene		styrene
	Perylene		bromoform
	Phenanthrene		1,1,1,2 -tetrachloroethane
	Pyrene		1,1,2,2 -tetrachloroethane
	Tetralin		cumene (isopropyl benzene)
	Dibenzo(a,c)anthracene + Picene (sum of 2)		1,2-dibromoethane (ethylene dibromide)

SCHEDULE "B2"

TEST CONTAMINANTS

Source Testing Program

Nitrogen Oxides
Sulphur Dioxide
Carbon Monoxide
Carbon Dioxide
Total Suspended Particulate Matter
PM 10
PM 2.5
Hydrogen Chloride
Ammonia
Calcium Oxide
Ferric Oxide

Metals		Volatile Organic Matter
Cd	Cadmium	acetone
Be	Beryllium	benzene
Pb	Lead	bromodichloromethane
Mo	Molybdenum	bromoform
Cr	Chromium	bromomethane
Ni	Nickel	butanone, 2 -
V	Vanadium	carbon tetrachloride
Al	Aluminum	chlorobenzene
Ti	Titanium	chloroethane
Mg	Magnesium	chloroform
B	Boron	chloromethane
Ba	Barium	cumene (isopropyl benzene)
P	Phosphorus	dibromochloromethane
K	Potassium	dichloroethane, 1,1 -
Hg	Mercury	dichloroethane, 1,2 -
As	Arsenic	dichloroethene, trans - 1,2 -
Zn	Zinc	dichloroethene, 1,1 – (vinyl chloride)
Sb	Antimony	dichloroethylene, cis - 1,2 -
Mn	Manganese	dichloropropane, 1,2 -
Co	Cobalt	ethylbenzene
Se	Selenium	ethylene dibromide (1,2-dibromoethane)
Cu	Copper	methylene chloride
Ag	Silver	styrene
Sn	Tin	tetrachloroethane, 1,1,1,2 -
Sr	Strontium	tetrachloroethane, 1,1,2,2 -
Tl	Thalium	tetrachloroethene
		toluene
		trichloroethane, 1,1,1 –
		trichloroethane, 1,1,2 -
		trichloroethene (trichloroethylene, 1,1,2 -)
		xylenes

Dioxins, Furans and Dioxin-like PCBs

2,3,7,8-Tetrachlorodibenzo-p-dioxin [2,3,7,8-TCDD]
1,2,3,7,8-Pentachlorodibenzo-p-dioxin [1,2,3,7,8-PeCDD]
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin [1,2,3,4,7,8-HxCDD]
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin [1,2,3,6,7,8-HxCDD]
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin [1,2,3,7,8,9-HxCDD]
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin [1,2,3,4,6,7,8-HpCDD]
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin [1,2,3,4,6,7,8,9-OCDD]
2,3,7,8-Tetrachlorodibenzofuran [2,3,7,8-TCDF]
2,3,4,7,8-Pentachlorodibenzofuran [2,3,4,7,8-PeCDF]
1,2,3,7,8-Pentachlorodibenzofuran [1,2,3,7,8-PeCDF]
1,2,3,4,7,8-Hexachlorodibenzofuran [1,2,3,4,7,8-HxCDF]
1,2,3,6,7,8-Hexachlorodibenzofuran [1,2,3,6,7,8-HxCDF]
1,2,3,7,8,9-Hexachlorodibenzofuran [1,2,3,7,8,9-HxCDF]
2,3,4,6,7,8-Hexachlorodibenzofuran [2,3,4,6,7,8-HxCDF]
1,2,3,4,6,7,8-Heptachlorodibenzofuran [1,2,3,4,6,7,8-HpCDF]
1,2,3,4,7,8,9-Heptachlorodibenzofuran [1,2,3,4,7,8,9-HpCDF]
1,2,3,4,6,7,8,9-Octachlorodibenzofuran [1,2,3,4,6,7,8,9-OCDF]

3,3',4,4'-Tetrachlorobiphenyl [3,3',4,4'-tetraCB (PCB 77)]
3,4,4',5- Tetrachlorobiphenyl [3,4,4',5-tetraCB (PCB 81)]
3,3',4,4',5- Pentachlorobiphenyl (PCB 126) [3,3',4,4',5-pentaCB (PCB 126)]
3,3',4,4',5,5'- Hexachlorobiphenyl [3,3',4,4',5,5'-hexaCB (PCB 169)]
2,3,3',4,4'- Pentachlorobiphenyl [2,3,3',4,4'-pentaCB (PCB 105)]
2,3,4,4',5- Pentachlorobiphenyl [2,3,4,4',5-pentaCB (PCB 114)]
2,3',4,4',5- Pentachlorobiphenyl [2,3',4,4',5-pentaCB (PCB 118)]
2',3,4,4',5- Pentachlorobiphenyl [2',3,4,4',5-pentaCB (PCB 123)]
2,3,3',4,4',5- Hexachlorobiphenyl [2,3,3',4,4',5-hexaCB (PCB 156)]
2,3,3',4,4',5'- Hexachlorobiphenyl [2,3,3',4,4',5'-hexaCB (PCB 157)]
2,3',4,4',5,5'- Hexachlorobiphenyl [2,3',4,4',5,5'-hexaCB (PCB 167)]
2,3,3',4,4',5,5'- Heptachlorobiphenyl [2,3,3',4,4',5,5'-heptaCB (PCB 189)]

Polycyclic Organic Matter:
Acenaphthylene
Acenaphthene
Anthracene
Benzo(a)anthracene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(a)fluorene
Benzo(b)fluorene
Benzo(ghi)perylene
Benzo(a)pyrene
Benzo(e)pyrene
2-Chloronaphthalene
Chrysene
Coronene
Dibenzo(a,c)anthracene
9,10-Dimethylanthracene
7,12-Dimethylbenzo(a)anthracene

Fluoranthene
Fluorene
Indeno(1,2,3-cd)pyrene
2-Methylanthracene
3-Methylcholanthrene
1-Methylnaphthalene
2-Methylnaphthalene
1-Methylphenanthrene
9-Methylphenanthrene
Naphthalene
Perylene
Phenanthrene
Picene
Pyrene
Tetralin
Triphenylene

Chlorinated Organics

total dichlorobenzenes
total trichlorobenzenes (1,3,5-; 1,2,3-; 1,2,4-)
total tetrachlorobenzenes (1,2,4,5-; 1,2,3,5-)
pentachlorobenzene
hexachlorobenzene
total dichlorophenols (2,3-; 2,4-; and 2,6-)
total trichlorophenols (2,3,4-; 2,4,5-; 2,4,6-; 3,4,5-)
total tetrachlorophenols (2,3,4,6-;2,3,5,6)
total pentachlorophenols

SCHEDULE "C"

MONITORING AND REPORTING PROCEDURES

A. SOURCE TESTING PROCEDURES

1. The Company shall submit, to the Manager a test protocol including the Pre-Test Information required by the Source Testing Code, at least thirty (30) days prior to the scheduled dates of the Source Testing Program.

2. The Company shall finalize the test protocol in consultation with the Manager.

3. The Company shall not commence the Source Testing until the Manager has accepted the test protocol.

4. The Company shall notify the District Manager and the Manager in writing of the location, date and time of any impending Source Testing required by this Approval, at least fifteen (15) days prior to the Source Testing.

5. The Director may not accept the results of the Source Testing Program if:
   (1) the Source Testing Code or the requirements of the Manager were not followed; or
   (2) the Company did not notify the District Manager and the Manager of the Source Testing; or
   (3) the Company failed to provide a complete report on the Source Testing.

B. REPORTING PROCEDURES

SOURCE TESTING PROGRAM

1. The Company shall submit a report on the Source Testing Program to the District Manager and the Manager not later than six (6) months after completing the Source Testing Program. The report shall be in the format described in the Source Testing Code, and shall also include, but not be limited to:

   (1) an executive summary;
   (2) records of operating conditions; including a summary of the results of the Raw Feed and Fuels Analysis and Monitoring Program as required by Condition 4 of this Approval;
   (3) all records produced by the continuous monitoring systems during the Demonstration Project;
   (4) assessment of compliance with the Cement Kiln Exhaust Stack Operating Limits for the parameters listed in Schedule "A1" attached to this Approval;
   (5) the results of source testing and air dispersion calculations in accordance with regulation 419/05, indicating the maximum concentration of the Test Contaminants emitted from the Cement Kiln Stack at the Point of Impingement and an assessment of compliance with Regulation 419/05 Schedule 3 standards; and
   (6) a description and explanation of any statistically significant changes in emissions from the Cement Kiln Exhaust Stack and Point of Impingement Concentrations of the Test Contaminants, if any, resulting from the use of Alternative Fuel, relative to the Baseline Conditions.

AMBIENT AIR MONITORING PROGRAM

2. The Company shall submit a report on the results of the Ambient Air Quality Monitoring Program, to the District Manager not later than six (6) months after completing the Demonstration Project . The report shall include, but not be limited to:

   (1) an executive summary;
   (2) records of operating conditions; including a summary of the results of the Raw Feed and Fuels Analysis and Monitoring Program;
   (3) sample dates, frequency and duration;
   (4) information on the exact location of samplers, including the analysis to site them. A map must be included, clearly showing where each monitoring station is located.
   (5) a description of the specifications of the monitors used in the Ambient Air Quality Monitoring Program;
   (6) a description of the specifications of the meteorological stations used to monitor and record meteorological conditions and analysis of wind direction
   (7) results of the Ambient Air Monitoring Program for the Test Contaminants listed in Schedule B1;
   (8) a description and explanation of any statistically significant changes in ambient air concentrations of the Test Contaminants, if any, resulting from the use of Alternative Fuel, relative to the Baseline Conditions.

SCHEDULE "D"

Continuous Monitoring System Requirements

PARAMETER: **Opacity**

INSTALLATION:
The Continuous Opacity Monitor shall be installed at an accessible location where the measurements are representative of the actual opacity of the gases leaving the *Cement Kiln Exhaust Stack* and shall meet the following design and installation specifications:

PARAMETERS	SPECIFICATION
1. Wavelength at Peak Spectral Response (nanometres, nm):	500 - 600
2. Wavelength at Mean Spectral Response (nm):	500 - 600
3. Detector Angle of View:	≤ 5 degrees
4. Angle of Projection:	≤ 5 degrees
5. Range (percent of opacity):	0 -100

PERFORMANCE:
The Continuous Opacity Monitor shall meet the following minimum performance specifications for the following parameters.

PARAMETERS	SPECIFICATION
1. Span Value (percent opacity):	80 percent
2. Calibration Error:	≤ 3 percent opacity
3. Attenuator Calibration:	≤ 2 percent opacity
4. Response Time (95 percent response to a step change):	≤ 10 seconds
5. Schedule for Zero and Calibration Checks:	daily minimum
6. Procedure for Zero and Calibration Checks:	all system components checked
7. Zero Calibration Drift (24-hours):	≤ 2 percent opacity
8. Span Calibration Drift (24-hours):	≤ 2 percent opacity
9. Conditioning Test Period:	≥ 168 hours without corrective maintenance
10. Operational Test Period:	≥ 168 hours without corrective maintenance

CALIBRATION:
The monitor shall be calibrated, to ensure that it meets the drift limits specified above, during the Demonstration Project . The results of all calibrations shall be recorded at the time of calibration.

DATA RECORDER:
The data recorder must be capable of registering continuously the measurement of the monitor with an accuracy of 0.5 percent of a full scale reading or better and with a time resolution of 30 seconds or better.

RELIABILITY:
The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 90 percent of the time during the Demonstration Project.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition No. 1 is included to outline the minimum performance requirements considered necessary to prevent an adverse effect resulting from the utilization of any Alternative Fuel for the Cement Kiln during the Demonstration Project.

2. Condition Nos. 2, 3 and 4 are included to require the Company to operate and maintain the Facility in accordance with the terms and conditions of this Approval.

3. Condition Nos. 5, 6, 7 and 8 are included to require the Company to gather accurate information so that the environmental impact and subsequent compliance with the EPA, Regulation 419/05 and this Approval can be verified.

4. Condition Nos. 9, 10, 11 and 12 are included to require the Company to retain records of information gathered during the Demonstration Project and to provide easy public access to information related to the Demonstration Project, so that the environmental impact and subsequent compliance with the EPA, the regulations and this Approval can be verified.

5. Condition No. 13 is included to require the Company to respond to any environmental complaints related to the Demonstration Project, according to procedures that include methods for preventing recurrence of similar incidents.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of
Part II.1 of the Environmental Protection Act
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 5th day of November, 2014

THIS APPROVAL WAS MAILED
ON November 7, 2014
H.A.
(Signed)

Rudolf Wan
Rudolf Wan, P.Eng.
Director
appointed for the purposes of Part II.1 of the *Environmental Protection Act*

QN/
c: District Manager, MOE York-Durham
Bridget Mills, P.Eng., BCX Environmental Consulting. ✓

Appendix B

Raw Feed and Conventional Fuel Sampling Program - Details

Appendix B-1

Material Sampling Methodology

BCX
ENVIRONMENTAL
CONSULTING

St. Marys Cement Inc. (Canada) Bowmanville Plant Alternative Fuels Demonstration Source Testing Program

Raw Material and Fuel Sampling Methodology

ECA No. 4614-826K9W, November 5, 2014

1. Introduction

The following methodology describes how to correctly obtain material samples during the alternative fuels demonstration source testing program at St. Marys Cement Inc. (Canada)'s (SMC's) Bowmanville Plant (Facility) as required by Condition 5 of the ECA (ECA no. 4614-826K9W, dated November 5, 2014).

2. Facility

The sampling program will be conducted at the SMC cement plant located at 400 Waverley Road South, in Bowmanville, Ontario by trained staff.

3. Material Sampling Scope

Sampling will be performed by trained staff using the methodology outlined by below.

Samples will be taken:

- Over a period of 3 days prior to the introduction of alternative fuels (**Baseline condition [B]**) during which 3 source tests will take place;
- Over the entire period when maximum alternative substitution has been reached (**Alternative Fuel Substitution condition [ALT]**) – expected to be up to 3 days during which 3 source tests will take place.

A sample of the following materials/fuel will be taken 3 times for each of the 6 source tests (total of 18 samples for each material/fuel):

- kiln feed;
- conventional fuel for kiln (coal); and
- conventional fuel for calciner (petroleum coke).

Appropriate sampling locations for each material have been determined by SMC's Project Manager (See Attachment 1) and will be documented on the Material Sampling Program Summary Sheet.

The sampling intervals should be equal time interval apart (e.g. for a 12 hour test, sampling at 8:30am; 12:30 am and 4:30pm).

A summary of the Material/Fuel Sampling Program for the Bowmanville plant is attached as Table 1.

Sample Composites/Delivery to the Laboratory

BCX staff will prepare the daily sample composites using the compositing method developed for this program. BCX will complete the Chain of Custody for the composite daily samples. SMC staff will submit the daily composite samples to their laboratory of choice for analysis.

4. Sampling Methodology

The following methodology is to be followed by the site personnel responsible for collecting the material samples. These procedures will be reviewed with the SMC Project Manager who is responsible for on-site staff training.

Before Sampling

- In addition to any required personal protection equipment, put on a dust mask and a pair of the heat resistant gloves provided;
- Label the glass jars for the kiln feed/fuel;
- Have a glass jar ready;
- Select a Ziploc bag and attach a label;
- Clean and dry the tool provided at the sampling location with water and/or paper towel (also provided at the sampling location).

Sampling

- Collect kiln feed/fuel using a plastic sample bag. Obtain a minimum of 300g of sample.
- Transfer hot materials to a glass jar and allow them to cool. Once the sample reaches/is close to room temperature, use the scoop or trowel to transfer the sample into a Ziploc bag;
- Use the sharpie pen provided to circle each type of process, location, day and sample and write the date, time and sampler's initials on the label in the spaces provided. Any deviations from the sampling protocol; unexpected events; observations should be documented in the Comments column on the Sample Summary Sheet;
- Place the sample inside of a second Ziploc bag (no label required) and in the cooler provided.

After Sampling

- Clean the sampling tool immediately after each use;
- Verify the sampling information on the Ziploc bag and complete the Sample Summary Sheet provided.

5. QA/QC

The SMC Project Manager is to review the Sample Summary Sheets at the end of the day to verify that samples are being collected; that the sampling intervals are appropriate and to review/act-upon any comments. The SMC Project Manager is to periodically observe sample collections to verify that the sampling methodology is being followed.

ATTACHEMENT 1: SAMPLING LOCATIONS

Material/Fuel	Sampling Location	Comments
Kiln Feed	Figure 1	
Conventional Fuel for Kiln	Figure 2	Same location for both fuels as the same fuel mill is used to grind both fuel mixes. Need to know which fuel is milled when taking samples.
Conventional Fuel for Calciner		

Figure 1: Kiln Feed Sampling Location

Kiln Feed Sample Button

Kiln Feed Sampling Location

Figure 2: Conventional Fuel Sampling Location

Conventional Fuel Sampling Button


Conventional Fuel Sampling Location

Appendix B-2

Sample Compositing Methodology

BCX
ENVIRONMENTAL
CONSULTING

St. Marys Cement Inc. (Canada) Bowmanville Plant
Alternative Fuels Demonstration Source Testing Program

Raw Material and Fuel Sample Compositing Methodology

ECA No. 4614-826K9W, November 5, 2014

1. Introduction

The following methodology describes how to correctly prepare composite samples from material samples collected during the alternative fuels demonstration source testing program at St. Marys Cement Inc. (Canada)'s (SMC's) Bowmanville Plant (Facility) as required by Condition 5 of the ECA (ECA no. 4614-826K9W, dated November 5, 2014).

2. Facility

The sample compositing program will be conducted at the SMC cement plant located at 400 Waverley Road South, in Bowmanville, Ontario by trained staff.

3. Sample Compositing Scope

The sample compositing procedure will be performed for the three daily material samples taken at each of the following sampling locations during the testing period (baseline and alternative fuel) as outlined in the Material/Fuel Sampling Methodology.

- kiln feed;
- conventional fuel for kiln – coal; and
- conventional fuel for calciner – petroleum coke.

Sample compositing will be performed by trained staff using the standard US EPA method as outlined in US EPA AP-42 Appendix C2 (sample splitting, coning and quartering). The detailed methodology is provided in Section 4 below.

4. Sampling Compositing Methodology

The following methodology is to be followed by trained staff responsible for preparing the composite material samples. These procedures will be reviewed with the SMC Project Manager who is responsible for on-site staff training.

Sample Compositing Tools

- A triangular/rectangular compositing tray with enough volume for mixing of three material samples;
- A wooden spatula; and
- Water and paper towels to clean the tools.

Before Sample Compositing

- In addition to any required personal protection equipment, put on a pair of heat-resistant gloves, a pair of safety glasses and a dust mask;
- Select two zip-lock bags and attach a label on each bag; and
- Clean and dry the sample compositing tools with water and/or paper towel.

Sample Compositing

- Transfer all three material samples into the compositing tray;
- Use the spatula to well mix the material and shape it into a neat cone;
- Flatten the cone by pressing the top without further mixing;
- Divide the flat circular pile into equal quarters by cutting or scraping out 2 diameters at right angles;
- Discard 2 opposite quarters; and
- Thoroughly mix the 2 remaining quarters, shape them into a cone, and repeat the quartering and discarding procedures until the sample is reduced to 0.8 to 3.6 kg (2 to 8 lb).
- Divide the composite sample into two equal sized samples and put them into two zip-lock bags (one for laboratory analysis and one to be stored as a back-up sample);
- Use the sharpie pen provided to circle each type of process, location, day and composite sample ID and write the date, time and sampler's initials on the label in the spaces provided;
- Place each sample inside of a second zip-lock bag (no label required) and in the cooler.

After Sample Compositing

- Clean the mixing tool immediately after each use;
- Fill out the sample information on the chain of custody form. The chain of custody form records information including sample composite preparation date, sample IDs, material sampling location, composite sample ID, and sampler's information. An example of the chain of custody form is presented in Appendix A.

At the End of the ALT Source Test

- SMC to ship the cooler(s) containing all of the composite samples to the laboratory for analysis and keep the back-up samples and chain of custody form on file.

5. QA/QC

The SMC Project Manager is to review the chain of custody form periodically to verify that composite samples are prepared properly and to review/act-upon any comments. The SMC manager is to periodically observe the sample compositing process to verify that the methodology is being followed.

ATTACHEMENT 1: Sampling Summary and Chain of Custody Form

Table 1 - Material and Fuel Sampling Program - Sampling Summary & Chain of Custody

Company Name: ______________________ Site Name: _________________ ECA No. _____________

Process Condition	**Acronym for Process Condition**	**Source Test No.**	**Material/Fuel Name**	**Acronym for Material/Fuel**	**Sample Location**	**Sample No.**	**Sampling Date**	**Sampling Time**	**Sample Code** (Process Condition-Source Test No.- Feed Stock - Sample No.)	**Sampler's Initials**	**Sampler's Name**	**Comments**	**Composite Sample IDs**	**Date Composite Sample Prepared**	**Sampler's Initials**	**Sampler's Name**

Appendix B-3

Raw Feed and Conventional Fuel Sampling Logs

Table 1 - Material and Fuel Sampling Program - Sampling Summary & Chain of Custody

Company Name: St. Marys Cemen SMC   Site Name: Bowmanville Plant   ECA No. 4614-826K9W (Alt Fuel Demo ECA)

Process Condition	Acronym for Process Condition	Source Test No.	Material/Fuel Name	Acronym for Material/Fuel	Sample Location	Sample No.	Sampling Date	Sampling Time	Sample Code (Process Condition-Source Test No.- Feed Stock - Sample No.)	Sampler's Initials	Sampler's Name	Comments	Composite Sample IDs	Date Composite Sample Prepared	Sampler's Initials	Sampler's Name
Baseline	B	1	Kiln Feed	KF	Kiln Feed	1	30-Sep-18	12:43	B-1-KF-1	CS	Chris Sabaziotis		B-1-KF-L B-1-KF-B	Sept 30 2018	CS	Chris Sabaziotis
Baseline	B	1	Kiln Feed	KF	Kiln Feed	2	30-Sep-18	2:39	B-1-KF-2	CS	Chris Sabaziotis					
Baseline	B	1	Kiln Feed	KF	Kiln Feed	3	30-Sep-18	4:14	B-1-KF-3	CS	Chris Sabaziotis					
Baseline	B	2	Kiln Feed	KF	Kiln Feed	1	10/1/2018	10:40	B-2-KF-1	CS	Chris Sabaziotis		B-2-KF-L B-2-KF-B	Oct 1 2018	CS	Chris Sabaziotis
Baseline	B	2	Kiln Feed	KF	Kiln Feed	2	10/1/2018	12:15	B-2-KF-2	CS	Chris Sabaziotis					
Baseline	B	2	Kiln Feed	KF	Kiln Feed	3	10/1/2018	1:15	B-2-KF-3	CS	Chris Sabaziotis					
Baseline	B	3	Kiln Feed	KF	Kiln Feed	1	10/2/2018	9:00	B-3-KF-1	CS	Chris Sabaziotis		B-3-KF-L B-3-KF-B	Oct 2 2018	CS	Chris Sabaziotis
Baseline	B	3	Kiln Feed	KF	Kiln Feed	2	10/2/2018	10:15	B-3-KF-2	CS	Chris Sabaziotis					
Baseline	B	1	Conventional Fuel for Kiln	CFK	Fuel Area	1	30-Sep-18	12:43	B-1-CFK-1	CS	Chris Sabaziotis		B-1-CFK-L B-1-CFK-B	Sept 30 2018	CS	Chris Sabaziotis
Baseline	B	1	Conventional Fuel for Kiln	CFK	Fuel Area	2	30-Sep-18	2:39	B-1-CFK-2	CS	Chris Sabaziotis	Coal mill down 2:42 - 3:13				
Baseline	B	1	Conventional Fuel for Kiln	CFK	Fuel Area	3	30-Sep-18	4:14	B-1-CFK-3	CS	Chris Sabaziotis					
Baseline	B	2	Conventional Fuel for Kiln	CFK	Fuel Area	1	10/1/2018	11:00*	B-2-CFK-1	CS	Chris Sabaziotis	Sample was taken after first round of samples, after swap to kiln	B-2-CFK-L B-2-CFK-B	Oct 1 2018	CS	Chris Sabaziotis
Baseline	B	2	Conventional Fuel for Kiln	CFK	Fuel Area	2	10/1/2018	N/A	B-2-CFK-2	CS	Chris Sabaziotis	No Sample Available, same fuel as calciner				
Baseline	B	2	Conventional Fuel for Kiln	CFK	Fuel Area	3	10/1/2018	N/A	B-2-CFK-3	CS	Chris Sabaziotis	No Sample Available, same fuel as calciner				
Baseline	B	3	Conventional Fuel for Kiln	CFK	Fuel Area	1	10/2/2018	N/A	B-3-CFK-1	CS	Chris Sabaziotis	No Sample Available, same fuel as calciner	B-3-CFK-L B-3-CFK-B	Oct 2 2018	CS	Chris Sabaziotis
Baseline	B	3	Conventional Fuel for Kiln	CFK	Fuel Area	2	10/2/2018	N/A	B-3-CFK-2	CS	Chris Sabaziotis	No Sample Available, same fuel as calciner				
Baseline	B	3	Conventional Fuel for Kiln	CFK	Fuel Area	3	10/2/2018	N/A	B-3-CFK-3	CS	Chris Sabaziotis	No Sample Available, same fuel as calciner				
Baseline	B	1	Conventional Fuel for Calciner	CFC	Fuel Area	1	30-Sep-18	12:43	B-1-CFC-1	CS	Chris Sabaziotis		B-1-CFC-L B-1-CFC-B	Sept 30 2018	CS	Chris Sabaziotis
Baseline	B	1	Conventional Fuel for Calciner	CFC	Fuel Area	2	30-Sep-18	2:39	B-1-CFC-2	CS	Chris Sabaziotis	Coal mill down 2:42 - 3:13				
Baseline	B	1	Conventional Fuel for Calciner	CFC	Fuel Area	3	30-Sep-18	4:14	B-1-CFC-3	CS	Chris Sabaziotis					
Baseline	B	2	Conventional Fuel for Calciner	CFC	Fuel Area	1	10/1/2018	10:40	B-2-CFC-1	CS	Chris Sabaziotis		B-2-CFC-L B-2-CFC-B	Oct 1 2018	CS	Chris Sabaziotis
Baseline	B	2	Conventional Fuel for Calciner	CFC	Fuel Area	2	10/1/2018	12:15	B-2-CFC-2	CS	Chris Sabaziotis					
Baseline	B	2	Conventional Fuel for Calciner	CFC	Fuel Area	3	10/1/2018	1:15	B-2-CFC-3	CS	Chris Sabaziotis					
Baseline	B	3	Conventional Fuel for Calciner	CFC	Fuel Area	1	10/2/2018	9:00	B-3-CFC-1	CS	Chris Sabaziotis		B-3-CFC-L B-3-CFC-B	Oct 2 2018	CS	Chris Sabaziotis
Baseline	B	3	Conventional Fuel for Calciner	CFC	Fuel Area	2	10/2/2018	10:15	B-3-CFC-2	CS	Chris Sabaziotis					
Baseline	B	3	Conventional Fuel for Calciner	CFC	Fuel Area	3	10/2/2018	11:45	B-3-CFC-3	CS	Chris Sabaziotis					

Table 1 - Material and Fuel Sampling Program - Sampling Summary & Chain of Custody

Company Name: St. Marys Cemen SMC   Site Name: Bowmanville Plant   ECA No. 4614-826K9W (Alt Fuel Demo ECA)

Process Condition	Acronym for Process Condition	Source Test No.	Material/Fuel Name	Acronym for Material/Fuel	Sample Location	Sample No.	Sampling Date	Sampling Time	Sample Code (Process Condition-Source Test No.- Feed Stock - Sample No.)	Sampler's Initials	Sampler's Name	Comments	Composite Sample IDs	Date Composite Sample Prepared	Sampler's Initials	Sampler's Name
Alt Fuel	ALT	1	Kiln Feed	KF	Kiln Feed	1	2018/10/10-2018/10/11	10/10/2018 13:00	ALT-1-KF-1	CS	Chris Sabaziotis	Test start at 11:53, Atox was down at 10:30, test paused at 1:56 (RWDI paused at 2:40)				
Alt Fuel	ALT	1	Kiln Feed	KF	Kiln Feed	2	2018/10/10-2018/10/11	10/11/2018 5:00	ALT-1-KF-2	CS	Chris Sabaziotis	Test resumed Oct 11	ALT-1-KF-L ALT-1-KF-B			
Alt Fuel	ALT	1	Kiln Feed	KF	Kiln Feed	3	2018/10/10-2018/10/11	10/11/2018 6:20	ALT-1-KF-3	CS	Chris Sabaziotis	Test complete at 6:20		Oct 11 2018	CS	Chris Sabaziotis
Alt Fuel	ALT	2	Kiln Feed	KF	Kiln Feed	1	10/12/2018	9:17	ALT-2-KF-1	CS	Chris Sabaziotis	Test start at 8:48				
Alt Fuel	ALT	2	Kiln Feed	KF	Kiln Feed	2	10/12/2018	10:45	ALT-2-KF-2	CS	Chris Sabaziotis		ALT-2-KF-L ALT-2-KF-B			
Alt Fuel	ALT	2	Kiln Feed	KF	Kiln Feed	3	10/12/2018	12:45	ALT-2-KF-3	CS	Chris Sabaziotis	Test complete at 1:13		Oct 12 2018	CS	Chris Sabaziotis
Alt Fuel	ALT	3	Kiln Feed	KF	Kiln Feed	1	10/12/2018	14:45	ALT-3-KF-1	CS	Chris Sabaziotis	Test start at 13:57				
Alt Fuel	ALT	3	Kiln Feed	KF	Kiln Feed	2	10/12/2018	16:30	ALT-3-KF-2	CS	Chris Sabaziotis		ALT-3-KF-L ALT-3-KF-B			
Alt Fuel	ALT	3	Kiln Feed	KF	Kiln Feed	3	10/12/2018	18:00	ALT-3-KF-3	CS	Chris Sabaziotis	Test complete at 18:20		Oct 12 2018	CS	Chris Sabaziotis
Alt Fuel	ALT	1	Conventional Fuel for Kiln	CFK	Fuel Area	1	2018/10/10-2018/10/11	N/A	ALT-1-CFK-1	CS	Chris Sabaziotis	Only Calciner samples during test				
Alt Fuel	ALT	1	Conventional Fuel for Kiln	CFK	Fuel Area	2	2018/10/10-2018/10/11	N/A	ALT-1-CFK-2	CS	Chris Sabaziotis	Only Calciner samples during test	ALT-1-CFK-L ALT-1-CFK-B			
Alt Fuel	ALT	1	Conventional Fuel for Kiln	CFK	Fuel Area	3	2018/10/10-2018/10/11	N/A	ALT-1-CFK-3	CS	Chris Sabaziotis	Only Calciner samples during test		Oct 11 2018	CS	Chris Sabaziotis
Alt Fuel	ALT	2	Conventional Fuel for Kiln	CFK	Fuel Area	1	10/12/2018	N/A	ALT-2-CFK-1	CS	Chris Sabaziotis	No Kiln Sample available				
Alt Fuel	ALT	2	Conventional Fuel for Kiln	CFK	Fuel Area	2	10/12/2018	N/A	ALT-2-CFK-2	CS	Chris Sabaziotis	No Kiln Sample available	ALT-2-CFK-L ALT-2-CFK-B			
Alt Fuel	ALT	2	Conventional Fuel for Kiln	CFK	Fuel Area	3	10/12/2018	N/A	ALT-2-CFK-3	CS	Chris Sabaziotis	No Kiln Sample available		Oct 12 2018	CS	Chris Sabaziotis
Alt Fuel	ALT	3	Conventional Fuel for Kiln	CFK	Fuel Area	1	10/12/2018	14:45	ALT-3-CFK-1	CS	Chris Sabaziotis					
Alt Fuel	ALT	3	Conventional Fuel for Kiln	CFK	Fuel Area	2	10/12/2018	16:30	ALT-3-CFK-2	CS	Chris Sabaziotis	No Kiln Sample available	ALT-3-CFK-L ALT-3-CFK-B			
Alt Fuel	ALT	3	Conventional Fuel for Kiln	CFK	Fuel Area	3	10/12/2018	18:00	ALT-3-CFK-3	CS	Chris Sabaziotis	No Kiln Sample available		Oct 12 2018	CS	Chris Sabaziotis
Alt Fuel	ALT	1	Conventional Fuel for Calciner	CFC	Fuel Area	1	2018/10/10-2018/10/11	10/10/2018 13:00	ALT-1-CFC-1	CS	Chris Sabaziotis	No Kiln Sample available				
Alt Fuel	ALT	1	Conventional Fuel for Calciner	CFC	Fuel Area	2	2018/10/10-2018/10/11	10/11/2018 5:00	ALT-1-CFC-2	CS	Chris Sabaziotis	No Kiln Sample available	ALT-1-CFC-L ALT-1-CFC-B			
Alt Fuel	ALT	1	Conventional Fuel for Calciner	CFC	Fuel Area	3	2018/10/10-2018/10/11	10/11/2018 6:20	ALT-1-CFC-3	CS	Chris Sabaziotis	No Kiln Sample available		Oct 11 2018	CS	Chris Sabaziotis
Alt Fuel	ALT	2	Conventional Fuel for Calciner	CFC	Fuel Area	1	10/12/2018	9:17	ALT-2-CFC-1	CS	Chris Sabaziotis	Test start at 8:48				
Alt Fuel	ALT	2	Conventional Fuel for Calciner	CFC	Fuel Area	2	10/12/2018	10:45	ALT-2-CFC-2	CS	Chris Sabaziotis		ALT-2-CFC-L ALT-2-CFC-B			
Alt Fuel	ALT	2	Conventional Fuel for Calciner	CFC	Fuel Area	3	10/12/2018	12:45	ALT-2-CFC-3	CS	Chris Sabaziotis	Test complete at 1:13		Oct 12 2018	CS	Chris Sabaziotis
Alt Fuel	ALT	3	Conventional Fuel for Calciner	CFC	Fuel Area	1	10/12/2018	14:45	ALT-3-CFC-1	CS	Chris Sabaziotis	No Calciner sample available				
Alt Fuel	ALT	3	Conventional Fuel for Calciner	CFC	Fuel Area	2	10/12/2018	16:30	ALT-3-CFC-2	CS	Chris Sabaziotis		ALT-3-CFC-L ALT-3-CFC-B			
Alt Fuel	ALT	3	Conventional Fuel for Calciner	CFC	Fuel Area	3	10/12/2018	18:00	ALT-3-CFC-3	CS	Chris Sabaziotis			Oct 12 2018	CS	Chris Sabaziotis

Table 1 - Material and Fuel Sampling Program - Sampling Summary & Chain of Custody

Company Name: St. Marys Cemen SMC Site Name: Bowmanville Plant ECA No. 4614-826K9W (Alt Fuel Demo ECA)

Process Condition	Acronym for Process Condition	Source Test No.	Material/Fuel Name	Acronym for Material/Fuel	Sample Location	Sample No.	Sampling Date	Sampling Time	Sample Code (Process Condition-Source Test No.- Feed Stock - Sample No.)	Sampler's Initials	Sampler's Name	Comments	Composite Sample IDs	Date Composite Sample Prepared	Sampler's Initials	Sampler's Name
Baseline*	B2	1	Kiln Feed	KF	Kiln Feed	1	7-Dec-18	9:25	B2-1-KF-1	CS	Chris Sabaziotis	Test start at 8:24, Test complete at 12:43	B2-1-KF-L B2-1-KF-B			
Baseline*	B2	1	Kiln Feed	KF	Kiln Feed	2	7-Dec-18	11:40	B2-1-KF-2	CS	Chris Sabaziotis					
Baseline*	B2	1	Kiln Feed	KF	Kiln Feed	3	7-Dec-18	12:30	B2-1-KF-3	CS	Chris Sabaziotis			7-Dec-18	CS	Chris Sabaziotis
Baseline*	B2	2	Kiln Feed	KF	Kiln Feed	1	7-Dec-18	2:30	B2-2-KF-1	CS	Chris Sabaziotis	Test start at 1:26 PM, Test complete at 5:48	B2-2-KF-L B2-2-KF-B			
Baseline*	B2	2	Kiln Feed	KF	Kiln Feed	2	7-Dec-18	3:48	B2-2-KF-2	CS	Chris Sabaziotis					
Baseline*	B2	2	Kiln Feed	KF	Kiln Feed	3	7-Dec-18	5:30	B2-2-KF-3	CS	Chris Sabaziotis			7-Dec-18	CS	Chris Sabaziotis
Baseline*	B2	3	Kiln Feed	KF	Kiln Feed	1	8-Dec-18	9:00	B2-3-KF-1	CS	Chris Sabaziotis		B2-3-KF-L B2-3-KF-B			
Baseline*	B2	3	Kiln Feed	KF	Kiln Feed	2	8-Dec-18	10:30	B2-3-KF-2	CS	Chris Sabaziotis					
Baseline*	B2	3	Kiln Feed	KF	Kiln Feed	3	8-Dec-18	11:45	B2-3-KF-3	CS	Chris Sabaziotis			8-Dec-18	CS	Chris Sabaziotis
Baseline*	B2	1	Conventional Fuel for Kiln	CFK	Fuel Area	1	7-Dec-18	N/A	B2-1-CFK-1	CS	Chris Sabaziotis	Sample 1 Calciner	B2-1-CFK-L B2-1-CFK-B			
Baseline*	B2	1	Conventional Fuel for Kiln	CFK	Fuel Area	2	7-Dec-18	N/A	B2-1-CFK-2	CS	Chris Sabaziotis	Sample 2 - Fuel Mill down for maintenance				
Baseline*	B2	1	Conventional Fuel for Kiln	CFK	Fuel Area	3	7-Dec-18	N/A	B2-1-CFK-3	CS	Chris Sabaziotis	Sample 3 - Calciner		7-Dec-18	CS	Chris Sabaziotis
Baseline*	B2	2	Conventional Fuel for Kiln	CFK	Fuel Area	1	7-Dec-18	N/A	B2-2-CFK-1	CS	Chris Sabaziotis	Sample 1 - Calciner	B2-2-CFK-L B2-2-CFK-B			
Baseline*	B2	2	Conventional Fuel for Kiln	CFK	Fuel Area	2	7-Dec-18	N/A	B2-2-CFK-2	CS	Chris Sabaziotis	Sample 2 - Calciner				
Baseline*	B2	2	Conventional Fuel for Kiln	CFK	Fuel Area	3	7-Dec-18	5:30	B2-2-CFK-3	CS	Chris Sabaziotis	Sample 3 Kiln		7-Dec-18	CS	Chris Sabaziotis
Baseline*	B2	3	Conventional Fuel for Kiln	CFK	Fuel Area	1	8-Dec-18	N/A	B2-3-CFK-1	CS	Chris Sabaziotis	Sample 1 - Calciner	B2-3-CFK-L B2-3-CFK-B			
Baseline*	B2	3	Conventional Fuel for Kiln	CFK	Fuel Area	2	8-Dec-18	10:30	B2-3-CFK-2	CS	Chris Sabaziotis	Sample 2 - Kiln				
Baseline*	B2	3	Conventional Fuel for Kiln	CFK	Fuel Area	3	8-Dec-18	N/A	B2-3-CFK-3	CS	Chris Sabaziotis	Sample 3 - Calciner		8-Dec-18	CS	Chris Sabaziotis
Baseline*	B2	1	Conventional Fuel for Calciner	CFC	Fuel Area	1	7-Dec-18	9:25	B2-1-CFC-1	CS	Chris Sabaziotis	Sample 1 Calciner	B2-1-CFC-L B2-1-CFC-B			
Baseline*	B2	1	Conventional Fuel for Calciner	CFC	Fuel Area	2	7-Dec-18	N/A	B2-1-CFC-2	CS	Chris Sabaziotis	Sample 2 - Fuel Mill down for maintenance				
Baseline*	B2	1	Conventional Fuel for Calciner	CFC	Fuel Area	3	7-Dec-18	12:30	B2-1-CFC-3	CS	Chris Sabaziotis	Sample 3 - Calciner		7-Dec-18	CS	Chris Sabaziotis
Baseline*	B2	2	Conventional Fuel for Calciner	CFC	Fuel Area	1	7-Dec-18	2:30	B2-2-CFC-1	CS	Chris Sabaziotis	Sample 1 - Calciner	B2-2-CFC-L B2-2-CFC-B			
Baseline*	B2	2	Conventional Fuel for Calciner	CFC	Fuel Area	2	7-Dec-18	3:48	B2-2-CFC-2	CS	Chris Sabaziotis	Sample 2 - Calciner				
Baseline*	B2	2	Conventional Fuel for Calciner	CFC	Fuel Area	3	7-Dec-18	5:30	B2-2-CFC-3	CS	Chris Sabaziotis	Sample 3 Kiln (not a lot of sample available)		7-Dec-18	CS	Chris Sabaziotis
Baseline*	B2	3	Conventional Fuel for Calciner	CFC	Fuel Area	1	8-Dec-18	9:00	B2-3-CFC-1	CS	Chris Sabaziotis	Sample 1 - Calciner	B2-3-CFC-L B2-3-CFC-B			
Baseline*	B2	3	Conventional Fuel for Calciner	CFC	Fuel Area	2	8-Dec-18	N/A	B2-3-CFC-2	CS	Chris Sabaziotis	Sample 2 - Kiln				
Baseline*	B2	3	Conventional Fuel for Calciner	CFC	Fuel Area	3	8-Dec-18	11:45	B2-3-CFC-3	CS	Chris Sabaziotis	Sample 3 - Calciner		8-Dec-18	CS	Chris Sabaziotis

* Referred to as Post-Baseline in report

Table 1 - Material and Fuel Sampling Program - Sampling Summary & Chain of Custody

Company Name: St. Marys Cemen SMC　　Site Name: Bowmanville Plant　　ECA No. 4614-826K9W (Alt Fuel Demo ECA)

Process Condition	Acronym for Process Condition	Source Test No.	Material/Fuel Name	Acronym for Material/Fuel	Sample Location	Sample No.	Sampling Date	Sampling Time	Sample Code (Process Condition-Source Test No.- Feed Stock - Sample No.)	Sampler's Initials	Sampler's Name	Comments	Composite Sample IDs	Date Composite Sample Prepared	Sampler's Initials	Sampler's Name
Alt Fuel	ALT2	1	Kiln Feed	KF	Kiln Feed	1	4-Dec-18	13:35	ALT2-1-KF-1	CS	Chris Sabaziotis	Conveyor Belt was frozen in morning, drag chain issues at 2:29. Test start at 1:35PM, Pause at 2:29, resume at 3:30, test complete at 6:30 PM	ALT2-1-KF-L ALT2-1-KF-B			
Alt Fuel	ALT2	1	Kiln Feed	KF	Kiln Feed	2	4-Dec-18	16:41	ALT2-1-KF-2	CS	Chris Sabaziotis					
Alt Fuel	ALT2	1	Kiln Feed	KF	Kiln Feed	3	4-Dec-18	18:00	ALT2-1-KF-3	CS	Chris Sabaziotis			7-Dec-18	CS	Chris Sabaziotis
Alt Fuel	ALT2	2	Kiln Feed	KF	Kiln Feed	1	5-Dec-18	9:45	ALT2-2-KF-1	CS	Chris Sabaziotis	Test start at 9:05, test complete at 1:30 PM	ALT2-2-KF-L ALT2-2-KF-B			
Alt Fuel	ALT2	2	Kiln Feed	KF	Kiln Feed	2	5-Dec-18	11:55	ALT2-2-KF-2	CS	Chris Sabaziotis					
Alt Fuel	ALT2	2	Kiln Feed	KF	Kiln Feed	3	5-Dec-18	13:15	ALT2-2-KF-3	CS	Chris Sabaziotis			7-Dec-18	CS	Chris Sabaziotis
Alt Fuel	ALT2	3	Kiln Feed	KF	Kiln Feed	1	6-Dec-18	9:40	ALT2-3-KF-1	CS	Chris Sabaziotis	Test start at 9:08, Pause 9:45-9:55, Pause 10:05-11:17, Pause 1:20PM - 4:20 PM, Pause 4:49 PM - 5:33 PM, Test complete at 6:09 (issues with material jamming, oversized, tarps)	ALT2-3-KF-L ALT2-3-KF-B			
Alt Fuel	ALT2	3	Kiln Feed	KF	Kiln Feed	2	6-Dec-18	13:15	ALT2-3-KF-2	CS	Chris Sabaziotis					
Alt Fuel	ALT2	3	Kiln Feed	KF	Kiln Feed	3	6-Dec-18	16:35	ALT2-3-KF-3	CS	Chris Sabaziotis			8-Dec-18	CS	Chris Sabaziotis
Alt Fuel	ALT2	1	Conventional Fuel for Kiln	CFK	Fuel Area	1	4-Dec-18	13:35	ALT2-1-CFK-1	CS	Chris Sabaziotis	Sample 1 Kiln	ALT2-1-CFK-L ALT2-1-CFK-B			
Alt Fuel	ALT2	1	Conventional Fuel for Kiln	CFK	Fuel Area	2	4-Dec-18	16:41	ALT2-1-CFK-2	CS	Chris Sabaziotis	Sample 2 Kiln				
Alt Fuel	ALT2	1	Conventional Fuel for Kiln	CFK	Fuel Area	3	4-Dec-18	N/A	ALT2-1-CFK-3	CS	Chris Sabaziotis	Sample 3 Calciner		7-Dec-18	CS	Chris Sabaziotis
Alt Fuel	ALT2	2	Conventional Fuel for Kiln	CFK	Fuel Area	1	5-Dec-18	N/A	ALT2-2-CFK-1	CS	Chris Sabaziotis	Sample 1 Calciner	ALT2-2-CFK-L ALT2-2-CFK-B			
Alt Fuel	ALT2	2	Conventional Fuel for Kiln	CFK	Fuel Area	2	5-Dec-18	11:55	ALT2-2-CFK-2	CS	Chris Sabaziotis	Sample 2 Kiln				
Alt Fuel	ALT2	2	Conventional Fuel for Kiln	CFK	Fuel Area	3	5-Dec-18	N/A	ALT2-2-CFK-3	CS	Chris Sabaziotis	Sample 3 Calciner		7-Dec-18	CS	Chris Sabaziotis
Alt Fuel	ALT2	3	Conventional Fuel for Kiln	CFK	Fuel Area	1	6-Dec-18	9:40	ALT2-3-CFK-1	CS	Chris Sabaziotis	Sample 1 Kiln	ALT2-3-CFK-L ALT2-3-CFK-B			
Alt Fuel	ALT2	3	Conventional Fuel for Kiln	CFK	Fuel Area	2	6-Dec-18	N/A	ALT2-3-CFK-2	CS	Chris Sabaziotis	Sample 2 Calciner				
Alt Fuel	ALT2	3	Conventional Fuel for Kiln	CFK	Fuel Area	3	6-Dec-18	16:35	ALT2-3-CFK-3	CS	Chris Sabaziotis	Sample 3 kiln		8-Dec-18	CS	Chris Sabaziotis
Alt Fuel	ALT2	1	Conventional Fuel for Calciner	CFC	Fuel Area	1	4-Dec-18	N/A	ALT2-1-CFC-1	CS	Chris Sabaziotis	Sample 1 Kiln	ALT2-1-CFC-L ALT2-1-CFC-B			
Alt Fuel	ALT2	1	Conventional Fuel for Calciner	CFC	Fuel Area	2	4-Dec-18	N/A	ALT2-1-CFC-2	CS	Chris Sabaziotis	Sample 2 Kiln				
Alt Fuel	ALT2	1	Conventional Fuel for Calciner	CFC	Fuel Area	3	4-Dec-18	18:00	ALT2-1-CFC-3	CS	Chris Sabaziotis	Sample 3 Calciner		7-Dec-18	CS	Chris Sabaziotis
Alt Fuel	ALT2	2	Conventional Fuel for Calciner	CFC	Fuel Area	1	5-Dec-18	9:45	ALT2-2-CFC-1	CS	Chris Sabaziotis	Sample 1 Calciner	ALT2-2-CFC-L ALT2-2-CFC-B			
Alt Fuel	ALT2	2	Conventional Fuel for Calciner	CFC	Fuel Area	2	5-Dec-18	N/A	ALT2-2-CFC-2	CS	Chris Sabaziotis	Sample 2 Kiln				
Alt Fuel	ALT2	2	Conventional Fuel for Calciner	CFC	Fuel Area	3	5-Dec-18	13:15	ALT2-2-CFC-3	CS	Chris Sabaziotis	Sample 3 Calciner		7-Dec-18	CS	Chris Sabaziotis
Alt Fuel	ALT2	3	Conventional Fuel for Calciner	CFC	Fuel Area	1	6-Dec-18	N/A	ALT2-3-CFC-1	CS	Chris Sabaziotis	Sample 1 Kiln	ALT2-3-CFC-L ALT2-3-CFC-B			
Alt Fuel	ALT2	3	Conventional Fuel for Calciner	CFC	Fuel Area	2	6-Dec-18	13:15	ALT2-3-CFC-2	CS	Chris Sabaziotis	Sample 2 Calciner				
Alt Fuel	ALT2	3	Conventional Fuel for Calciner	CFC	Fuel Area	3	6-Dec-18	N/A	ALT2-3-CFC-3	CS	Chris Sabaziotis	Sample 3 kiln		8-Dec-18	CS	Chris Sabaziotis

Appendix B-4

Raw Feed and Conventional Fuel Analysis

Raw Feed and Conventional Fuel Analysis Results

RAW FEED						
CAS Number	Metal	Units	Average Baseline	Average Alternative Fuels 1 (AF1)	Average Alternative Fuels 2 (AF2)	Average Post Baseline
7440-36-0	Antimony	ug/g	0.21	ND	0.23	ND
7440-38-2	Arsenic	ug/g	1.57	1.47	1.53	1.43
7440-39-3	Barium	ug/g	49.33	45.33	31.33	28.67
7440-41-7	Beryllium	ug/g	0.30	0.28	0.29	0.30
7440-43-9	Cadmium	ug/g	0.23	0.25	0.18	0.16
7440-47-3	Chromium	ug/g	10.13	14.00	12.33	13.33
7440-48-4	Cobalt	ug/g	2.40	2.87	2.87	2.70
1309-37-1	Iron	ug/g	11666.67	12666.67	11666.67	12333.33
7439-92-1	Lead	ug/g	9.67	7.33	8.03	7.90
7439-96-5	Manganese	ug/g	296.67	323.33	293.33	286.67
7440-02-0	Nickel	ug/g	7.87	10.97	8.93	9.13
7782-49-2	Selenium	ug/g	ND	ND	ND	ND
7440-22-4	Silver	ug/g	ND	ND	ND	ND
7440-31-5	Tin	ug/g	1.25	1.10	1.00	ND
7440-62-2	Vanadium	ug/g	9.83	9.93	9.53	9.40
7439-97-6	Mercury	ug/g	0.27	0.30	0.18	0.18
NA	Chlorine	ug/g	378.00	567.33	630.00	743.33
NA	Fluorine	ug/g	380.00	416.67	586.67	700.00
	Iodine	ug/g	12.00	14.33	12.00	12.00
	Bromine	ug/g	ND	ND	ND	11.50

Notes:

ND = Not Detected

CONVENTIAL FUEL KILN						
CAS Number	Metal	Units	Average Baseline	Average Alternative Fuels 1 (AF1)	Average Alternative Fuels 2 (AF2)	Average Post Baseline
7440-36-0	Antimony	ug/g	ND	ND	0.24	0.23
7440-38-2	Arsenic	ug/g	8.25	6.90	6.47	7.15
7440-39-3	Barium	ug/g	21.00	21.00	21.67	22.50
7440-41-7	Beryllium	ug/g	0.42	0.35	0.35	0.39
7440-43-9	Cadmium	ug/g	0.11	ND	ND	ND
7440-47-3	Chromium	ug/g	5.90	5.60	6.47	5.25
7440-48-4	Cobalt	ug/g	2.60	2.40	2.63	2.70
1309-37-1	Iron	ug/g	11500.00	10000.00	10666.67	10000.00
7439-92-1	Lead	ug/g	5.05	3.70	4.63	4.45
7439-96-5	Manganese	ug/g	28.00	20.00	42.67	39.50
7440-02-0	Nickel	ug/g	6.55	5.70	6.90	6.90
7782-49-2	Selenium	ug/g	1.50	1.30	1.30	1.30
7440-22-4	Silver	ug/g	ND	ND	ND	ND
7440-31-5	Tin	ug/g	ND	ND	ND	ND
7440-62-2	Vanadium	ug/g	12.00	11.00	12.67	12.50
7439-97-6	Mercury	ug/g	0.19	0.14	0.19	0.60
NA	Chlorine	ug/g	917.50	1020.00	1103.33	1130.00
NA	Fluorine	ug/g	220.00	ND	ND	ND
	Iodine	ug/g	3.50	2.70	6.33	6.00
	Bromine	ug/g	9.50	9.00	13.67	15.00

ND = Not Detected

CONVENTIAL FUEL CALCINER						
CAS Number	Metal	Units	Average Baseline	Average Alternative Fuels 1 (AF1)	Average Alternative Fuels 2 (AF2)	Average Post Baseline
7440-36-0	Antimony	ug/g	0.20	ND	0.23	0.23
7440-38-2	Arsenic	ug/g	7.97	6.50	6.87	7.07
7440-39-3	Barium	ug/g	20.67	24.67	20.67	22.00
7440-41-7	Beryllium	ug/g	0.39	0.36	0.39	0.36
7440-43-9	Cadmium	ug/g	0.10	ND	0.11	ND
7440-47-3	Chromium	ug/g	5.30	6.47	6.90	5.70
7440-48-4	Cobalt	ug/g	2.43	2.63	2.87	2.70
1309-37-1	Iron	ug/g	11000.00	10666.67	10666.67	10500.00
7439-92-1	Lead	ug/g	4.60	3.97	4.87	4.70
7439-96-5	Manganese	ug/g	23.00	22.67	43.67	47.33
7440-02-0	Nickel	ug/g	6.53	6.30	7.17	6.80
7782-49-2	Selenium	ug/g	5.20	1.30	1.23	1.27
7440-22-4	Silver	ug/g	ND	ND	ND	ND
7440-31-5	Tin	ug/g	ND	ND	ND	ND
7440-62-2	Vanadium	ug/g	11.67	11.50	13.00	11.67
7439-97-6	Mercury	ug/g	0.27	4.08	0.20	0.20
NA	Chlorine	ug/g	941.67	1035.33	1083.33	1136.67
NA	Fluorine	ug/g	ND	ND	ND	ND
	Iodine	ug/g	3.23	3.37	6.33	8.00
	Bromine	ug/g	10.33	11.00	14.00	14.67

ND = Not Detected

Appendix C

RWDI Source Testing Report

REPORT

ST MARYS CEMENT INC. (CANADA)

BOWMANVILLE, ONTARIO

ALT FUEL DEMONSTRATION SOURCE TESTING PROGRAM (ECA# 4614-826K9W)

RWDI #1804600

March 21, 2019

SUBMITTED TO

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EXECUTIVE SUMMARY

RWDI AIR Inc. (RWDI) has been retained by St. Marys Cement Inc. (Canada), (St Marys) to conduct emission sampling on the kiln exhaust at their facility in Bowmanville, Ontario. The purpose of this source sampling program is to demonstrate compliance with their demonstration Environmental Compliance Approval No.4614-826K9W dated November 5, 2014. As per the Environmental Compliance Approval (ECA) each parameter was tested in triplicate while running under two scenarios, conventional fuel (baseline) and conventional fuel with alternative fuels (Alt Fuels). A copy of the ECA is provided in **Appendix A**.

The Pre-Test Plan for this testing program was submitted August 30, 2018 to the Ontario Ministry of the Environment, Conservation and Parks (MECP). Approval for the testing program was granted by the MECP on September 18, 2018. A copy of the MECP approval letter can be found in **Appendix B**.

Testing was conducted over two separate dates on September 30 to October 12, 2018, and December 4 to 8, 2018. Pre-baseline testing was completed September 30 to October 2, post-baseline testing was completed December 7 and 8th, and the alternative fuels testing was completed October 10 and 12, and December 4 to 6th. Testing in the October timeframe did not meet the desired Alt Fuels firing rate, therefore, a repeat of the program was conducted in December.

The following represents a summary of the stack testing results and compares the testing results to the in-stack limits set out in the Environmental Compliance Approval.

Parameter	October Pre-Baseline Results	October Alt Fuel Results	December Alt Fuel Results	December Post-Baseline Results	ECA Limit
Limits in Schedule A2 of the C of A (4614-826K9W)					
Particulate Matter	12.4 mg/Rm^3	8.2 mg/Rm^3	19 mg/Rm^3	20 mg/Rm^3	50 mg/Rm^3
Cadmium	0.192 µg/Rm^3	0.30 µg/Rm^3	0.14 µg/Rm^3	0.16 µg/Rm^3	7 µg/Rm^3
Lead	7.25 µg/Rm^3	5.3 µg/Rm^3	1.4 µg/Rm^3	0.89 µg/Rm^3	60 µg/Rm^3
Mercury	2.46 µg/Rm^3	1.5 µg/Rm^3	1.4 µg/Rm^3	0.86 µg/Rm^3	20 µg/Rm^3
Dioxins and Furans	16.6 pg/Rm^3 as ITEQ	20 pg/Rm^3 as ITEQ	8.7 pg/Rm^3 as ITEQ	9.5 pg/Rm^3 as ITEQ	80 pg/Rm^3 as ITEQ
Hydrochloric Acid	8.8 mg/Rm^3	6.1 mg/Rm^3	7.6 mg/Rm^3	3.0 mg/Rm^3	27 mg/Rm^3

Note: R=25°C, 101.3kPa, 11% oxygen, dry

Results of the testing confirm that all parameters are in compliance with respect to the ECA limits. A summary of all testing results can be found in the **Tables** section of the report with detailed sampling results in the **Appendices**.

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1 INTRODUCTION

RWDI AIR Inc. (RWDI) has been retained by St. Marys Cement Inc. (Canada), (St Marys) to conduct emission sampling on the kiln exhaust at their facility in Bowmanville, Ontario. The purpose of this source sampling program is to demonstrate compliance with their demonstration Environmental Compliance Approval No.4614-826K9W, dated November 5, 2014. As per the Environmental Compliance Approval (ECA) each parameter was tested in triplicate while running under two scenarios, conventional fuel (baseline) and conventional fuel with alternative Fuels (Alt Fuel). A copy of the ECA is provided in **Appendix A**.

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This stack testing study consisted of the following parameters:

- Velocity, flow rate and temperature;
- Total Particulate Matter;
- Metals;
- Polyaromatic Hydrocarbons (PAH's) and Dioxins and furans (PCDD and PCDF's);
- PM_{10} and $PM_{2.5}$;
- Volatile Organic Compounds (VOC's);
- Hydrogen Chloride;
- Ammonia;
- Carbon Monoxide;
- Oxygen (O_2);
- Carbon dioxide (CO_2);
- Nitrogen Oxide (NO_x); and
- Sulphur Dioxide (SO_2)

The cement plant can operate 12 months, 24 hours per day, and 7 days per week with a theoretical maximum production capacity of 6300 tonnes of clinker per day. The normal operating capacity 5000 to 5500 tonnes of clinker per day.

2 SOURCE DESCRIPTION

2.1 Facility Description

The fundamental process of cement manufacturing consists of combining materials bearing calcium oxide, silica, alumina and iron oxide at high temperatures to produce cement clinker. The clinker is subsequently ground with finishing materials such as gypsum, limestone, clay and slag to produce cement.

The cement plant operates 12 months per year typically on 24 hours per day, 7 days per week schedule, with a maximum production capacity of 6,300 tonnes of clinker per day.

2.2 Process Description

The plant primarily produces Portland cement by combining materials bearing calcium carbonate, silica, alumina and iron oxide at high temperatures to produce cement clinker. The clinker is subsequently ground with finishing materials such as gypsum and limestone to produce cement. Other operations at the Facility are ancillary operations such as comfort heating and emergency generators.

The simplified process flow diagram and site layout is attached.

2.2.1 Limestone Extraction

Limestone is extracted from the quarry by blasting various limestone benches. Up to 150 holes can be drilled along the blast face covering a maximum horizontal surface area of approximately 1,000 m^2 (i.e. 100,000 tonnes/blast). Blasting typically occurs between one to three times per week.

Front-end loaders transfer the fragmented stone from the blast face onto mining tractors. The fragmented stone is transported either to the Facility's underground primary crusher which feeds the primary surge pile (two bank rock storage piles) for the Facility or to the construction grade limestone stockpile.

2.2.2 Construction Grade Limestone Processing

The composition of limestone extracted from the quarry varies with depth and location. A portion of the extracted limestone is sorted, processed and transferred offsite by CBM Aggregates.

CBM Aggregates operates one front-end loader, one primary crusher and one secondary crusher/screen below grade in the quarry. Construction grade limestone from the construction grade storage pile in the quarry is transferred by a front-end loader into CBM's primary crusher. From this point material is conveyed to CBM's secondary crusher/screen and to the product stockpiles by a series of conveyors. The limestone is crushed into different material sizes (e.g. HL6, 19mm clear run, 19mm crusher run, 50mm clear run, 50mm crusher run and screenings). These processed materials are transported to an above grade storage/shipping area located south of the Facility.

The construction grade limestone processing area and storage/shipping area typically operates 12 hours per day, 7 days per week, with a maximum processing capacity of 300 tonnes/hour.

2.2.3 Cement Manufacturing Operations

Raw Material and Fuel Delivery and Storage

The main raw material (limestone) is supplied by the on-site limestone quarry. Limestone is transferred from the primary surge pile via an enclosed conveyor system to a secondary crusher/screen system which is controlled by baghouses. Processed limestone is then fed via enclosed conveyors to limestone storage silos.

Other raw materials (e.g. sand, iron, overburden and ash) are delivered by truck, additives (gypsum) and solid fuels (i.e. petroleum cokes) are delivered by ship. Gypsum and conventional solid fuel (i.e. petroleum coke and coal) are transported by truck to the plant from the dock. A small portion of the conventional solid fuels is delivered by truck via the main plant road. SMC's material/conventional fuel storage and handling operations at the dock area are approved under ECA # 6346-9DSL5P dated December 5, 2013.

Most raw materials are stored at the plant in storage silos or storage buildings. Conventional solid fuels from the dock are deposited into the fuel underground hopper from where they are transferred into the fuel storage silos.

Sorted and pre-processed (size reduced) clean wood and/or low carbon alternative fuel is approved to be delivered by enclosed trucks and off-loaded into a storage and handling area inside a fully enclosed fuel building.

Raw Material Preparation

Limestone, sand, iron oxide, and overburden sources are proportionately fed from the raw material storage silos and storage building via an enclosed conveyor belt system to a raw mill. Emissions from the raw mill are controlled by the kiln feed baghouse, venting through the main kiln stack. In the raw mill, the raw materials are ground and mixed to a uniform particle size and dried. The raw mill uses the hot exhaust gases from the pre-heater tower to dry the raw meal. The dried raw meal is stored in the kiln feed silo.

Fuel Preparation

Conventional solid fuels are fed to the fuel milling system from the storage silos. Emissions are controlled by the fuel mill baghouse venting through the main kiln stack. Milled conventional fuel (fuel meal) is fed to the kiln burner and calciner burner through their individual fuel feed systems (i.e. two fuel meal silos and dust collectors).

When clean wood and/or low carbon alternative fuels are used, the homogenized fuel is then fed via a series of conveyors that feed the main kiln burner and/or the calciner burner. The burning zone temperature in the kiln and calciner are over 2,100°C and 1,375°C, respectively.

The alternative fuel feed system is fully integrated with the plant control system to regulate and limit the fuel substitution rates into the kiln and/or calciner to maintain the required temperature profile and system conditions.

Clinker Production

Dried raw meal is fed, via air slides and bucket elevators, up to a dual string pre-heater tower consisting of a series of cyclones. As the raw meal progressively passes through a pre-heater string and its cyclones, it encounters progressively hotter gases from the kiln. Prior to being directed into the kiln, the pre-heated material is fed into a pre-calciner where the material temperature is raised to 850°C. In the kiln, the raw meal temperature is raised to over 1,500°C. The chemical reactions and physical processes transform the raw meal into clinker. Flue gases from the kiln pass through the pre-heater strings and the bypass stream and raw mill to the kiln baghouse and are exhausted to the atmosphere via the main kiln stack.

The clinker product is cooled by passing ambient air across the product. This air is directed into the kiln for use as combustion air. The clinker is then further cooled in a reciprocating grate cooler, which achieves a lower clinker discharge temperature by passing an additional quantity of air through the clinker. This additional air passes through the cooler baghouse prior to being exhausted to the atmosphere through the cooler stack.

Clinker exits the clinker cooler at an approximate temperature of 100°C to 200°C onto an enclosed conveyor system, which feeds one of four clinker storage silos. Cooled clinker from the clinker storage silos is conveyed to the roller press where it is pre-ground. Pre-ground clinker is then transferred into the cement finish mill feed silos.

Cement Production

Cement finishing is accomplished in three individual ball grinding mills. Clinker, limestone and gypsum are milled together to produce cement. The three finish mills are controlled by individual baghouses venting through two finish mill stacks.

The finished cement product is transferred into product storage silos. Product can be dispatched via tanker truck or by ship.

In addition to finished cement product, the plant also ships clinker. Cement and clinker are transported to the dock using an enclosed conveyor system.

Other Associated Equipment/Operations

In an effort to reduce nitrogen oxides (NO_X) and sulphur dioxide (SO_2) emissions, the Facility uses a Selective Non-Catalytic NO_X Reduction (SNCR) ammonia solution injection system and hydrated limestone injection to reduce NO_X emissions and SO_2 emissions, respectively.

2.2.4 Alternative Fuel System

Alternative fuels are delivered by truck into the new fuel building through one of two Eco docks (up to 10 tonnes per day). The alternative fuel is then transferred via enclosed screw feeders directly onto an enclosed conveyor which feeds the material directly into the calciner at a maximum rate of 4 tonnes per hour. The system is continuously monitored from the control operator room and interlocks are in place to assure compliance with regulatory process requirements.

3 SAMPLING LOCATION

3.1 Sample Location Description

The sampling location on the kiln stack is located 84.5 metres above grade equipped with a proper sampling platform and four 90° offset sample ports. This sampling location is considered 'ideal' as per the Ontario Source Test Code Method 1 since the nearest flow disturbances were greater than eight (8) duct diameters downstream and two (2) duct diameters upstream. The stack height is 105 m, the diameter at the testing location is 5.48 m and the outside diameter is 5.68 m, including the layer of insulation.

Continuous emission monitoring for O_2 and CO_2 was performed at the same point on the stack platform. These measurements were taken from a single point near the center of the stack. These measurements were sampled continuously throughout the isokinetic testing.

4 SAMPLING METHODOLOGY

The following section provides an overview of the sampling methodologies used in this program. **Table 1**, located in the **Tables** section, summarizes the testing parameters and corresponding methodologies.

4.1 Stack Velocity, Temperature, and Volumetric Flow Rate Determination

The exhaust velocities and flow rates were determined following the Ontario Source Testing Code (OSTC) Method 2, "Determination of Stack Gas Velocity and Flow Rate (Type S Pitot Tube)". Velocity measurements were taken with a pre-calibrated S-Type Pitot tube and incline manometer.

Volumetric flow rates were determined following the equal area method as outlined in OSTC Method 2. Temperature measurements were made simultaneously with the velocity measurements and were conducted using a chromel-alumel type "k" thermocouple in conjunction with a digital temperature indicator.

The dry molecular weight of the stack gas was determined following calculations outlined in OSTC Method 3, "Determination of Molecular Weight of Dry Stack Gas". Stack moisture content was determined through direct condensation and according to OSTC Method 4, "Determination of Moisture Content of Stack Gas".

4.2 Sampling for Total Particulate Matter and Metals

The testing was performed in accordance with U.S. EPA Method 29 "Determination of Metals Emissions from Stationary Sources". Both TPM and metals (including mercury) were sampled concurrently using the same sampling train.

Sampling was conducted isokinetically using the required number of traverse points across the stack diameter. The sample was drawn through a glass lined sample probe and quartz fibre filter, which was maintained at a temperature of 120 ± 14ºC (248 ± 25ºF). The sample was then introduced into the impinger train. The impinger train included two (2) 5% HNO_3/10% H_2O_2 absorbing solution impingers, one (1) empty impinger, two (2) impingers containing acidified $KMnO_4$ solution and one (1) impinger containing silica gel. Particulate emissions are collected on the heated filter; gaseous emissions are collected in the hydrogen peroxide and acidified potassium permanganate solution impingers. Mercury is analyzed specifically in the permanganate solution and all metals including mercury are analyzed in the peroxide impingers.

For the isokinetic testing, a total of 32 points (eight (8) per traverse) were used. Sampling duration was 7.5 minutes per point (2.5 min readings) with a total sampling time per isokinetic test of 240 minutes.

Upon completion of the test, the sampling train was recovered, as in the procedures detailed in the reference method, and the samples were packaged for transport to Maxxam Analytical Services in Burlington, Ontario for analysis.

4.3 Polyaromatic Hydrocarbons (PAH's) and Dioxin and Furan Congeners (PCDD/PCDF)

Sampling for polyaromatic hydrocarbons and dioxin and furan congeners was performed in accordance with Environment Canada Method 1/RM/2 (1/RM/2) "Measurement of Releases of Selected Semi-Volatile Organic Compounds from Stationary Sources". The dioxin and furan sampling was conducted in combination with PAH sampling from the Voluntary sampling program.

Sampling was conducted isokinetically using the required number of traverse points across the stack diameter. The sample was drawn through a glass lined sample probe and proofed glass fibre filter. Both of these were maintained at a temperature of 120 ± 14ºC (248 ± 25ºF).

The sample then passed through a water cooled condenser and an XAD-2 absorbent module. The temperature of the XAD-2 module was kept below 20°C. The stack gas sample was then introduced into the impinger train. The impinger train was configured as specified in the reference method.

All glassware and filters were cleaned and proofed in accordance with procedures in 1/RM/2 prior to use in the field. Cleaning, proofing and analysis were performed by Maxxam Analytical Services in Burlington, Ontario.

Upon completion of the test, the samples were kept cool and delivered to Maxxam Analytical Services. The filter, XAD-2 module, impinger catch, and all rinses were analysed for the PCDD/PCDF's using high resolution gas chromatography / mass spectrometry.

For the isokinetic testing, a total of 32 points (eight (8) per traverse) were used. Sampling duration was 7.5 minutes per point (2.5 min readings) with a total sampling time per isokinetic test of 240 minutes.

4.4 Sampling for Hydrogen Chloride and Ammonia

Sampling for hydrogen chloride and ammonia was completed following U.S. EPA Method 26 "Determination of Hydrogen Halide and Halogen Emissions from Stationary Sources - Non-Isokinetic Method". The sampling was conducted using a midget impinger sampling train. The sample was drawn through a glass lined probe, glass fibre filter and three-way stopcock which was maintained at a temperature of 120 ± 14ºC (248 ± 25ºF). The sample then entered the impinger train, which consisted of three impingers. The impingers included two 0.1N sulphuric acidic impingers, and one silica impinger to dry the sample air.

Upon completion of the testing, samples were kept cool and submitted to Maxxam Analytical Services in Burlington, Ontario for analysis.

4.5 Sampling for Volatile Organic Compounds

Sampling for volatile organic compounds (VOC) was conducted using a volatile organic sampling train (VOST) following U.S. EPA SW846 Method 0030. Sample gas was collected on a pair of adsorbent tubes, the first containing tenax, and the second, a combination of tenax/charcoal. Since there was no visible condensate in the knock out flask located after the first tube, it was not recovered for analysis. Each set of tubes was sampled over a 60-minute period at 0.25 L/min. Samples were then submitted to Maxxam Analytical Services for analysis.

Similar to PAH and PCDD/PCDF's testing, VOST tubes were "proofed" to ensure that there was no contamination before taking any samples.

4.6 Sampling for PM_{10}, and $PM_{2.5}$

Sampling of PM_{10} and $PM_{2.5}$ was performed in accordance with U.S. EPA Method 201A (filterable only). Sampling was conducted using an Environmental Supply C-5000 Source Sampling System, and in-stack sizing cyclones. A gas sample was extracted at a constant flow rate through an in-stack cyclone. The sizing cyclone separates particles with nominal aerodynamic diameters of 10 µm and 2.5 µm. The particulate mass is determined gravimetrically. The impingers were then recovered according to the method to determine moisture content. Sampling was conducted over 12 points, with a test target time of 120 minutes.

4.7 Continuous Emissions Monitoring for CO, O_2, CO_2, NO_x and SO_2

Testing for CO, O_2 and CO_2 was accomplished using continuous emission monitors (CEM). The exhaust gas sample was withdrawn from a single point at the center of the duct using a stainless steel probe. The sample proceeded to a heated filter, where particulate matter was removed, and then transferred via a heated Teflon line to a sample conditioner. The Teflon line was heated above the condensation temperature of the exhaust gas stream. The sample conditioner removed any moisture in the exhaust. The sample was then routed through a manifold system and introduced to the individual CEM's for measurement. St Marys Cement on-site CEM's were used for the SO_2 and NO_x sampling through-out the program.

Prior to testing, sample system bias checks and instrument linearity checks (calibration error) were completed. In addition, the analysers were calibrated (zeroed and span checked) at the completion of each run. A Campbell Scientific data logger system programmed to collect and record data at 1- second intervals. Average 1-minute concentrations were recorded from the 1-second measurements.

Measurements for all of the parameters were continuously monitored through-out the manual test methods (i.e. metals and dioxin and furans).

4.8 Quality Assurance/Quality Control Activities

Applicable quality assurance measures were implemented during the sampling program to ensure the integrity of the results. These measures included detailed documentation of field data, equipment calibrations for all measured parameters, completion of Chain of Custody forms when submitting laboratory samples, and submission of field blank samples to the laboratories. **Table 2** presents a sample log and summarizes the sampling times, sample ID's, filter ID's, and XAD trap ID's.

Quality control procedures specific to the CEM monitoring included linearity checks, to determine the instrument performance, and reproducibility checks prior to its use in the field. Regular performance checks on the analyser were also carried out during the testing program by performing zero checks and span calibration checks using primary gas standards. Sample system bias checks were also done. These checks were used to verify the ongoing accuracy of the monitor and sampling system over time. Pollutant-free (zero) air was introduced to perform the zero checks, followed by a known calibration (span) gas into the monitor. The response of the monitor to pollutant-free air and the corresponding sensitivity to the span gas were recorded regularly during the tests.

All samplers are bench tested and calibrated in RWDI's Guelph office prior to field deployment and, in many cases, calibrated again in the field before use. For each sample collected with a Method 5 sampling train, both pre- and post- leak checks were conducted by plugging the inlet and drawing a vacuum of 380 mm of water for at least one minute. Dry gas meter reading leakage rates greater than 4% of the average sampling rate or 0.00057 m^3/min (0.02cfm), whichever is less, were unacceptable. Similar leak check procedures for the Pitot tube and pressure lines were conducted. A number of blanks are included in the methods and were submitted for analyses as well Chain of Custody forms were completed and submitted along with the samples to the laboratory. All sampling media was provided or prepared by the laboratory responsible for its subsequent analysis.

5 RESULTS

The average emission results for this study are presented in the **Tables** section of this report. A minimum of three (3) tests were performed for all of the parameters tested in the study. Detailed information for each test run can be found in the **Appendices**. Below is a table identifying each parameter, the corresponding table and appendices where the results are located.

Parameter	Table: Pre-Baseline - Oct (a), Alt Fuels - Oct (b), Alt Fuels – Dec (c), Post-Baseline – Dec (d)	Appendix
Stack Gas Characteristics	3	C and D
Particulate Matter and Metals	4	C
Dioxins and Furan Isomers	5	D
PAH's	6	D
PM_{10} and $PM_{2.5}$	7	E
Hydrogen Chloride and Ammonia	8	G
VOC's	9	H
Oxygen and Carbon Dioxide	10	F
ECA Limit Comparison	11	N/A
Summary of Operating Conditions	12	L

All field notes taken during this study are presented in **Appendix J**. All calibration information for the equipment used for this study is included in **Appendix I**. All laboratory results are included in **Appendix K**.

Process parameters and CEM monitoring records are provided in **Appendix L**.

6 OPERATING CONDITIONS

Operating conditions during the sampling period were monitored by St. Marys personnel. All equipment was operated under normal maximum operating conditions.

Radio contact was kept between the process operators and the sampling team. A member of the RWDI sampling team contacted the operator before each test, to ensure that the process was at normal operating conditions. **Appendix L** contains the process information supplied by St. Marys personnel.

TABLES

Table 1 - Sampling Parameters and Methods

Kiln

Source Location	No. of Tests	Sampling Parameter	Sampling Method
Kiln	12	Velocity, Temperature and Flow Rate	OSTC [1] Methods 1-4
	12	Total Particulate Matter	OSTC [1] Methods 5
	12	Metals	U.S. EPA[2] Method 29
	12	Dioxins, furans, and dioxin-like PCBs	Environment Canada Method RM/2
	12	PM_{10} and $PM_{2.5}$	U.S. EPA[2] Method 201A(filterable)
	12	HCl and Ammonia	U.S. EPA[2] Method 26 (non-isokinetic)
	12	Volatile Organic Matter	U.S. EPA[2] SW 846 0030 VOST
	12	Oxygen	OSTC[1] Method 3A
	12	Carbon Dioxide	OSTC[1] Method 3A

Notes:

[1] OSTC - Ontario Source Testing Code - Version 3

[2] U.S. EPA - United States Environmental Protection Agency

Table 2A: Sampling Summary and Sample Log - Baseline Oct.

Kiln

Source and Test #	Sampling Date	Start Time	End Time	Filter ID / Trap ID	Lab Sample ID
Velocity / Metals / Mercury					
Test #1	30-Sep-18	12:06 PM	4:25 PM	18072358	HYV713
Test #2	1-Oct-18	8:57 AM	1:21 PM	18072359	HYV714
Test #3	2-Oct-18	8:08 AM	12:40 PM	18072360	HYV715
Velocity / Dioxins and Furans					
Test #1	30-Sep-18	12:06 PM	4:25 PM	XAD Trap #4	HZP289
Test #2	1-Oct-18	8:57 AM	1:21 PM	XAD Trap #9	HZP290
Test #3	2-Oct-18	8:08 AM	12:40 PM	XAD Trap #2	HZP291
HCL and Ammonia					
Test #1	30-Sep-18	1:10 PM	2:10 PM	NA	HYV992
Test #2	1-Oct-18	10:20 AM	11:20 AM	NA	HYW001
Test #3	2-Oct-18	10:30 AM	11:30 AM	NA	HYW002
VOST					
Test #1	30-Sep-18	12:10 PM	1:10 PM	NA	HYT930
Test #2	1-Oct-18	1:20 PM	2:20 PM	NA	HYT931
Test #3	2-Oct-18	2:30 PM	3:30 PM	NA	HYT932

Table 2B: Sampling Summary and Sample Log - Alt. Fuel Oct.

Kiln

Source and Test #	Sampling Date	Start Time	End Time	Filter ID / Trap ID	Lab Sample ID
Velocity / Metals / Mercury					
Test #1	10-Oct-18	11:53 AM	2:00 PM	18072364	IAK788
Test #2	12-Oct-18	8:45 AM	1:15 PM	18077236	IAK789
Test #3	12-Oct-18	1:57 PM	4:00 PM	18072365	IAK808
Velocity / Dioxins and Furans	9				
Test #1	10-Oct-18	11:53 AM	2:00 PM	XAD Trap #9	IAM339
Test #2	12-Oct-18	8:45 AM	1:15 PM	XAD Trap #8	IAM340
Test #3	12-Oct-18	1:57 PM	4:00 PM	XAD Trap #3	IAM358
HCL and Ammonia	9				
Test #1	10-Oct-18	9:10 AM	10:10 AM	NA	IAK816
Test #2	12-Oct-18	10:20 AM	11:20 AM	NA	IAK817
Test #3	12-Oct-18	11:30 AM	12:30 PM	NA	IAK818
VOST					
Test #1	10-Oct-18	11:55 AM	12:55 PM	Pair #8	IAK606
Test #2	12-Oct-18	8:50 AM	9:50 AM	Pair #9	IAK607
Test #3	12-Oct-18	2:20 AM	3:20 AM	Pair #1	IAK608

Table 2C: Sampling Summary and Sample Log - Alt. Fuel Dec.

Kiln

Source and Test #	Sampling Date	Start Time	End Time	Filter ID / Trap ID	Lab Sample ID
Velocity / Metals / Mercury					
Test #1	4-Dec-18	1:02 PM	6:20 PM	18091413	IAK788
Test #2	5-Dec-18	9:05 AM	1:30 PM	18091414	IAK789
Test #3	6-Dec-18	9:06 AM	1:30 PM	18091416	IAK808
Velocity / Dioxins and Furans	9				
Test #1	4-Dec-18	1:02 PM	6:20 PM	XAD Trap #10	INM731
Test #2	5-Dec-18	9:05 AM	1:30 PM	XAD Trap #9	INM732
Test #3	6-Dec-18	9:08 AM	1:30 PM	XAD Trap #8	INM733
HCL and Ammonia	9				
Test #1	4-Dec-18	2:40 PM	3:40 PM	NA	INF807
Test #2	5-Dec-18	11:30 AM	12:30 PM	NA	INF808
Test #3	6-Dec-18	9:30 AM	10:30 AM	NA	INF809
VOST					
Test #1	4-Dec-18	1:35 PM	2:35 PM	Pair #1	INA544
Test #2	5-Dec-18	10:15 AM	11:15 AM	Pair #8	INA545
Test #3	6-Dec-18	11:25 AM	12:25 PM	Pair #10	INA546

Table 2D: Sampling Summary and Sample Log - Baseline Dec.

Kiln

Source and Test #	Sampling Date	Start Time	End Time	Filter ID / Trap ID	Lab Sample ID
Velocity / Metals / Mercury					
Test #1	7-Dec-18	8:24 AM	12:32 PM	18091417	INF785
Test #2	7-Dec-18	1:30 PM	5:40 PM	18091418	INF786
Test #3	8-Dec-18	7:56 AM	12:20 PM	18091419	INF787
Velocity / Dioxins and Furans	9				
Test #1	7-Dec-18	8:24 AM	12:32 PM	XAD Trap #3	INM855
Test #2	7-Dec-18	1:30 PM	5:40 PM	XAD Trap #6	INM856
Test #3	8-Dec-18	7:56 AM	12:20 PM	XAD Trap #2	INM857
HCL and Ammonia					
Test #1	7-Dec-18	8:30 AM	9:30 AM	NA	INF810
Test #2	7-Dec-18	11:40 AM	12:40 PM	NA	INF811
Test #3	8-Dec-18	11:20 AM	12:20 PM	NA	INF812
VOST					
Test #1	7-Dec-18	9:55 AM	10:55 AM	Pair #5	INE336
Test #2	7-Dec-18	2:40 PM	3:40 PM	Pair #3	INE337
Test #3	8-Dec-18	8:50 AM	9:50 AM	Pair #6	INE338

Table 3A: Sampling Summary - Flow Characteristics - Baseline Oct.
Kiln

Stack Gas Parameter		Test No. 1			Test No. 2			Test No. 3			TOTAL AVERAGE
		Metals	D and F[1]	Average	Metals	D and F[1]	Average	Metals	D and F[1]	Average	Average
Testing Date		30-Sep-18			1-Oct-18			2-Oct-18			-
Stack Temperature	°F	260	267	264	250	257	254	248	256	252	**256**
	°C	127	131	129	121	125	123	120	124	122	**125**
Moisture	%	7.0%	7.7%	7.4%	7.4%	7.8%	7.6%	7.6%	8.0%	7.8%	**7.6%**
Velocity	ft/s	53.93	56.96	55.45	55.25	58.14	56.70	54.75	57.63	56.19	**56.11**
	m/s	16.44	17.36	16.90	16.84	17.72	17.28	16.69	17.57	17.13	**17.10**
Actual Flow Rate	CFM	823,395	869,692	846544	843,498	877,677	860588	835,857	879,943	857,900	**855,010**
Referenced Flow Rate[2]	CFM	577,690	598,946	588318	597,680	610,575	604128	592,326	599,482	595,904	**596,117**
	m^3/s	273	283	278	282	288	285	279	283	281	**281**
Sampling Isokinetic Rate	%	101	102	102	100	99	100	101	101	101	**101**

***Notes*:**

[1] D and F = Dioxins, Furans, and Dioxin-like PCBs

[2] Referenced flow rate expressed as dry at 101.3 kPa, 25 °C, and Actual Oxygen

Detailed sampling results including individual test results can be found in Appendix C and D

Table 3B: Sampling Summary - Flow Characteristics - Alt. Fuel Oct.

Kiln

Stack Gas Parameter		Test No. 1			Test No. 2			Test No. 3			TOTAL AVERAGE
		Metals	D and F [1]	Average	Metals	D and F [1]	Average	Metals	D and F [1]	Average	Average
Testing Date		10-Oct-18			12-Oct-18			12-Oct-18			-
Stack Temperature	°F	269	274	272	259	267	263	260	266	263	**266**
	°C	132	134	133	126	131	128	127	130	128	**130**
Moisture	%	8.0%	9.8%	8.9%	7.6%	8.0%	7.8%	9.4%	7.9%	8.7%	**8.5%**
Velocity	ft/s	58.86	57.84	58.35	57.22	57.27	57.25	56.55	57.46	57.01	**57.53**
	m/s	17.94	17.63	17.79	17.44	17.46	17.45	17.24	17.51	17.38	**17.54**
Actual Flow Rate	acf/min	898,749	883,126	890938	873,574	874,461	874018	863,445	877,317	870,381	**878,445**
Referenced Flow Rate[2]	dscf/min	597,847	572,114	584981	589,754	582,153	585954	569,995	584,794	577,395	**582,776**
	m^3/s	282	270	276	278	275	276	269	276	272	**275**
Sampling Isokinetic Rate	%	100	104	102	99	101	100	101	102	102	**101**

***Notes*:**

[1] D and F = Dioxins, Furans, and Dioxin-like PCBs

[2] Referenced flow rate expressed as dry at 101.3 kPa, 25 °C, and Actual Oxygen

Detailed sampling results including individual test results can be found in Appendix C and D

Table 3C: Sampling Summary - Flow Characteristics - Alt. Fuel Dec.
Kiln

Stack Gas Parameter		Test No. 1			Test No. 2			Test No. 3			TOTAL AVERAGE
		Metals	D and F [1]	Average	Metals	D and F [1]	Average	Metals	D and F [1]	Average	Average
Testing Date		10-Oct-18			12-Oct-18			12-Oct-18			-
Stack Temperature	°F	252	259	256	245	251	248	238	247	243	**249**
	°C	122	126	124	118	122	120	114	119	117	**120**
Moisture	%	9.2%	6.5%	7.9%	10.1%	6.8%	8.5%	7.1%	7.1%	7.1%	**7.8%**
Velocity	ft/s	59.13	58.06	58.60	57.46	58.23	57.85	56.57	55.57	56.07	**57.50**
	m/s	18.02	17.70	17.86	17.51	17.75	17.63	17.24	16.94	17.09	**17.53**
Actual Flow Rate	acf/min	902,837	886,528	894683	877,366	889,014	883190	863,772	848,447	856,110	**877,994**
Referenced Flow Rate[2]	dscf/min	610,777	611,931	611354	591,119	616,251	603685	607,191	589,872	598,532	**604,524**
	m^3/s	288	289	288	278	291	284	286	278	282	**285**
Sampling Isokinetic Rate	%	103	101	102	101	100	101	99	99	99	**101**

***Notes* :**
[1] D and F = Dioxins, Furans, and Dioxin-like PCBs
[2] Referenced flow rate expressed as dry at 101.3 kPa, 25 °C, and Actual Oxygen
Detailed sampling results including individual test results can be found in Appendix C and D

Table 3D: Sampling Summary - Flow Characteristics - Baseline Dec.
Kiln

Stack Gas Parameter		Test No. 1			Test No. 2			Test No. 3			TOTAL AVERAGE
		Metals	D and F [1]	Average	Metals	D and F [1]	Average	Metals	D and F [1]	Average	Average
Testing Date		7-Dec-18			7-Dec-18			8-Dec-18			-
Stack Temperature	°F	235	246	243	235	244	240	243	251	247	**243**
	°C	113	119	116	113	118	115	117	122	119	**117**
Moisture	%	7.2%	6.4%	6.8%	7.2%	6.7%	7.0%	6.9%	6.5%	6.7%	**6.8%**
Velocity	ft/s	55.99	55.98	55.99	56.27	58.57	57.42	54.91	57.03	55.97	**56.46**
	m/s	17.07	17.06	17.06	17.15	17.85	17.50	16.74	17.38	17.06	**17.21**
Actual Flow Rate	acf/min	854,874	854,735	854805	859,143	894,316	876730	838,407	870,816	854,612	**862,049**
Referenced Flow Rate[2]	dscf/min	611,196	607,837	609517	614,571	635,143	624857	595,317	613,510	604,414	**612,929**
	m^3/s	288	287	288	290	300	295	281	289	285	**289**
Sampling Isokinetic Rate	%	100	100	100	99	101	100	99	101	100	**100**

***Notes*:**
[1] D and F = Dioxins, Furans, and Dioxin-like PCBs
[2] Referenced flow rate expressed as dry at 101.3 kPa, 25 °C, and Actual Oxygen
Detailed sampling results including individual test results can be found in Appendix C and D

Table 4A: Mercury and Metals - Averaged Results - Baseline Oct.

Kiln

Parameter	Concentration	Concentration @ 11% O_2	Emission Rate
Particulate	**(mg/m^3)**	**11% O_2 (mg/m^3)**	**(mg/s)**
Total Particulate Matter	7.30	12.4	2020
Metals	**($\mu g/m^3$)**	**($\mu g/m^3$)**	**(mg/s)**
Combined Train Aluminum (Al)	219	371	60.7
Combined Train Antimony (Sb)	< 1.56	< 2.64	< 0.436
Combined Train Arsenic (As)	< 0.501	< 0.849	< 0.139
Combined Train Barium (Ba)	6.40	10.8	1.780
Combined Train Beryllium (Be)	< 0.094	< 0.159	< 0.0262
Combined Train Boron (B)	< 19.1	< 32.4	< 5.30
Combined Train Cadmium (Cd)	0.113	0.192	0.032
Combined Train Calcium (Ca)	2520	4271	702
Combined Train Chromium (Cr)	< 1.91	< 3.24	< 0.53
Combined Train Cobalt (Co)	< 0.740	< 1.25	< 0.20
Combined Train Copper (Cu)	1.18	2.00	0.327
Combined Train Iron (Fe)	164	278	45.6
Combined Train Lead (Pb)	4.28	7.25	1.19
Combined Train Magnesium (Mg)	108	183	30.1
Combined Train Manganese (Mn)	6.18	10.5	1.71
Combined Train Molybdenum (Mo)	3.21	5.44	0.89
Combined Train Nickel (Ni)	1.87	3.17	0.518
Combined Train Phosphorus (P)	< 47.9	< 81.2	< 13.4
Combined Train Potassium (K)	386	654	107
Combined Train Selenium (Se)	< 1.04	< 1.76	< 0.291
Combined Train Silver (Ag)	< 1.32	< 2.24	< 0.36
Combined Train Strontium (Sr)	5.01	8.49	1.39
Combined Train Thallium (Tl)	< 0.148	< 0.251	< 0.041
Combined Train Tin (Sn)	30.2	51.2	8.41
Combined Train Titanium (Ti)	13.3	22.5	3.68
Combined Train Vanadium (V)	< 0.365	< 0.62	< 0.102
Combined Train Zinc (Zn)	< 9.53	< 16.2	< 2.64
Mercury	**($\mu g/m^3$)**	**($\mu g/m^3$)**	**(mg/s)**
Total Mercury	1.45	2.46	0.403
Calcium Oxide	3525	6185	969
Ferric Oxide	469	823	128.9

Notes:

[1] Sampling followed U.S. EPA Method 29 (Mercury)

[2] All referenced concentration values are expressed at 101.3kPa, 25 ^{o} C,

[3] Average of three tests

[4] When laboratory analysis was below the detection limit, the Reportable Detection Limit (RDL) was used to calculate the concentration and emission rate

Calcium and ferric oxide calculated from metals with molecular wt conversion

Detailed sampling results including individual test results can be found in Appendix C

Table 4B - Metals and Mercury - Alt. Fuel Oct.

Kiln

Parameter	Concentration	Concentration @ 11% O_2	Emission Rate
Particulate	**(mg/m^3)**	**11% O_2 (mg/m^3)**	**(mg/s)**
Total Particulate Matter	4.7	8.2	1290
Metals	**($\mu g/m^3$)**	**($\mu g/m^3$)**	**(mg/s)**
Combined Train Aluminum (Al)	137	240	37.9
Combined Train Antimony (Sb)	< 1.95	< 3.42	< 0.539
Combined Train Arsenic (As)	< 0.520	< 0.91	< 0.144
Combined Train Barium (Ba)	6.02	10.56	1.67
Combined Train Beryllium (Be)	< 0.12	< 0.21	< 0.032
Combined Train Boron (B)	< 19.5	< 34.2	< 5.39
Combined Train Cadmium (Cd)	< 0.170	< 0.30	< 0.047
Combined Train Calcium (Ca)	1500	2632	416
Combined Train Chromium (Cr)	< 1.95	< 3.42	< 0.540
Combined Train Cobalt (Co)	< 0.12	< 0.21	< 0.034
Combined Train Copper (Cu)	< 1.07	< 1.88	< 0.295
Combined Train Iron (Fe)	95.20	167	26.4
Combined Train Lead (Pb)	3.04	5.33	0.840
Combined Train Magnesium (Mg)	60.2	106	17
Combined Train Manganese (Mn)	2.60	4.56	0.722
Combined Train Molybdenum (Mo)	3.02	5.30	0.836
Combined Train Nickel (Ni)	2.07	3.63	0.575
Combined Train Phosphorus (P)	< 59.8	< 105	< 16.5
Combined Train Potassium (K)	296	519	81.6
Combined Train Selenium (Se)	< 1.30	< 2.28	< 0.359
Combined Train Silver (Ag)	< 0.156	< 0.27	< 0.043
Combined Train Strontium (Sr)	3.29	5.77	0.910
Combined Train Thallium (Tl)	< 0.160	< 0.28	< 0.043
Combined Train Tin (Sn)	26.5	46.5	7.32
Combined Train Titanium (Ti)	10.60	18.6	2.93
Combined Train Vanadium (V)	< 0.390	< 0.68	< 0.108
Combined Train Zinc (Zn)	< 9.07	< 15.91	< 2.51
Mercury	**($\mu g/m^3$)**	**($\mu g/m^3$)**	**(mg/s)**
Total Mercury	< 0.88	< 1.55	< 0.244
Calcium Oxide	2099	3682	577
Ferric Oxide	272	477	74.8

Notes:

[1] Sampling followed U.S. EPA Method 29 (Mercury)

[2] All referenced concentration values are expressed at 101.3kPa, 25 ^{o} C,

[3] Average of three tests

[4] When laboratory analysis was below the detection limit, the Reportable Detection Limit (RDL) was used to calculate the concentration and emission rate

Calcium and ferric oxide calculated from metals with molecular wt conversion

Detailed sampling results including individual test results can be found in Appendix C

Table 4C - Metals and Mercury - Alt. Fuel Dec.

Kiln

Parameter	Concentration	Concentration @ 11% O_2	Emission Rate
Particulate	**(mg/m^3)**	**11% O_2 (mg/m^3)**	**(mg/s)**
Total Particulate Matter	14.6	19.0	4170
Metals	**($\mu g/m^3$)**	**($\mu g/m^3$)**	**(mg/s)**
Combined Train Aluminum (Al)	74	96	21.1
Combined Train Antimony (Sb)	< 1.78	< 2.32	< 0.507
Combined Train Arsenic (As)	< 0.475	< 0.62	< 0.135
Combined Train Barium (Ba)	6.71	8.75	1.91
Combined Train Beryllium (Be)	< 0.11	< 0.14	< 0.030
Combined Train Boron (B)	< 17.8	< 23.21	< 5.07
Combined Train Cadmium (Cd)	< 0.107	< 0.14	< 0.030
Combined Train Calcium (Ca)	553	721	158
Combined Train Chromium (Cr)	< 1.78	< 2.32	< 0.507
Combined Train Cobalt (Co)	< 0.11	< 0.15	< 0.032
Combined Train Copper (Cu)	< 1.31	< 1.71	< 0.373
Combined Train Iron (Fe)	82.90	108	23.6
Combined Train Lead (Pb)	1.05	1.37	0.300
Combined Train Magnesium (Mg)	64.5	84.1	18
Combined Train Manganese (Mn)	8.32	10.8	2.370
Combined Train Molybdenum (Mo)	2.84	3.70	0.808
Combined Train Nickel (Ni)	1.46	1.90	0.417
Combined Train Phosphorus (P)	< 54.7	< 71.31	< 15.5
Combined Train Potassium (K)	< 93	< 122	< 26.6
Combined Train Selenium (Se)	< 1.19	< 1.55	< 0.338
Combined Train Silver (Ag)	< 0.160	< 0.21	< 0.046
Combined Train Strontium (Sr)	1.75	2.28	0.498
Combined Train Thallium (Tl)	< 0.143	< 0.19	< 0.041
Combined Train Tin (Sn)	11.7	15.3	3.34
Combined Train Titanium (Ti)	6.52	8.50	1.85
Combined Train Vanadium (V)	< 0.357	< 0.47	< 0.101
Combined Train Zinc (Zn)	< 9.89	< 12.9	< 2.82
Mercury	**($\mu g/m^3$)**	**($\mu g/m^3$)**	**(mg/s)**
Total Mercury	1.10	1.43	0.306
Calcium Oxide	774	1009	220
Ferric Oxide	237	309	67.5

Notes:

[1] Sampling followed U.S. EPA Method 29 (Mercury)

[2] All referenced concentration values are expressed at 101.3kPa, 25 ^{o} C,

[3] Average of three tests

[4] When laboratory analysis was below the detection limit, the Reportable Detection Limit (RDL) was used to calculate the concentration and emission rate

Calcium and ferric oxide calculated from metals with molecular wt conversion

Detailed sampling results including individual test results can be found in Appendix C

Table 4D - Metals and Mercury - Baseline Dec.

Kiln

Parameter	Concentration	Concentration @ 11% O_2	Emission Rate
Particulate	**(mg/m^3)**	**11% O_2 (mg/m^3)**	**(mg/s)**
Total Particulate Matter	14.30	20.4	4120
Metals	**($\mu g/m^3$)**	**($\mu g/m^3$)**	**(mg/s)**
Combined Train Aluminum (Al)	51	73	14.7
Combined Train Antimony (Sb)	< 1.84	< 2.63	< 0.526
Combined Train Arsenic (As)	< 0.490	< 0.700	< 0.140
Combined Train Barium (Ba)	5.81	8.3	1.670
Combined Train Beryllium (Be)	< 0.110	< 0.157	< 0.0316
Combined Train Boron (B)	< 18.4	< 26.3	< 5.26
Combined Train Cadmium (Cd)	< 0.110	< 0.157	< 0.032
Combined Train Calcium (Ca)	287	410	82
Combined Train Chromium (Cr)	< 1.84	< 2.63	< 0.53
Combined Train Cobalt (Co)	< 0.110	< 0.16	< 0.03
Combined Train Copper (Cu)	< 0.93	< 1.33	< 0.267
Combined Train Iron (Fe)	59	84	16.9
Combined Train Lead (Pb)	0.62	0.89	0.18
Combined Train Magnesium (Mg)	38	54	10.9
Combined Train Manganese (Mn)	1.91	2.7	0.55
Combined Train Molybdenum (Mo)	3.62	5.17	1.03
Combined Train Nickel (Ni)	1.12	1.60	0.321
Combined Train Phosphorus (P)	< 56.4	< 80.6	< 16.1
Combined Train Potassium (K)	< 74	< 105	< 21
Combined Train Selenium (Se)	< 1.23	< 1.76	< 0.351
Combined Train Silver (Ag)	< 0.17	< 0.24	< 0.05
Combined Train Strontium (Sr)	0.76	1.08	0.22
Combined Train Thallium (Tl)	< 0.147	< 0.210	< 0.042
Combined Train Tin (Sn)	10.1	14.4	2.90
Combined Train Titanium (Ti)	5.3	7.5	1.51
Combined Train Vanadium (V)	< 0.368	< 0.53	< 0.105
Combined Train Zinc (Zn)	< 6.13	< 8.8	< 1.75
Mercury	**($\mu g/m^3$)**	**($\mu g/m^3$)**	**(mg/s)**
Total Mercury	< 0.60	< 0.86	< 0.173
Calcium Oxide	402	574	116
Ferric Oxide	168	240	48.6

Notes:

[1] Sampling followed U.S. EPA Method 29 (Mercury)

[2] All referenced concentration values are expressed at 101.3kPa, 25 ° C,

[3] Average of three tests

[4] When laboratory analysis was below the detection limit, the Reportable Detection Limit (RDL) was used to calculate the concentration and emission rate

Calcium and ferric oxide calculated from metals with molecular wt conversion

Detailed sampling results including individual test results can be found in Appendix C

Table 5A: Dioxins and Furans - Averaged Results - Baseline Oct

Kiln

	Average Concentration	Average Concentration @25 °C and 11 % O_2	Reg 419 Toxic Equivalency Factors		
			TEF	TEF Concentration	TEF Emission Rate
Parameter	**(pg/m^3)**	**(pg/m^3)**		**(pg TEQ/m^3)**	**(pg/s)**
2,3,7,8-Tetra CDD*	4.10	6.95	1.00	7.00	1150
1,2,3,7,8-Penta CDD	2.20	3.73	1.00	3.79	625
1,2,3,4,7,8-Hexa CDD	1.70	2.88	0.10	0.290	47.9
1,2,3,6,7,8-Hexa CDD	1.67	2.83	0.10	0.285	47.0
1,2,3,7,8,9-Hexa CDD	1.55	2.63	0.10	0.265	43.7
1,2,3,4,6,7,8-Hepta CDD	2.26	3.83	0.01	0.0386	6.37
1,2,3,4,6,7,8,9-Octa CDD	4.31	7.31	0.0003	0.00221	0.364
2,3,7,8-Tetra CDF**	2.60	4.41	0.10	0.446	73.5
1,2,3,7,8-Penta CDF	1.78	3.02	0.03	0.0911	15.0
2,3,4,7,8-Penta CDF	1.80	3.05	0.30	0.911	150
1,2,3,4,7,8-Hexa CDF	1.59	2.69	0.10	0.271	44.8
1,2,3,6,7,8-Hexa CDF	1.31	2.22	0.10	0.224	36.9
2,3,4,6,7,8-Hexa CDF	1.72	2.92	0.10	0.294	48.5
1,2,3,7,8,9-Hexa CDF	1.71	2.90	0.10	0.292	48.2
1,2,3,4,6,7,8-Hepta CDF	1.73	2.93	0.01	0.030	4.87
1,2,3,4,7,8,9-Hepta CDF	1.93	3.27	0.01	0.0329	5.44
1,2,3,4,6,7,8,9-Octa CDF	2.52	4.27	0.0003	0.0129	2.13
33'44'-TetraCB-(77)***	17.3	29.3	0.0001	0.00295	0.487
344'5-TetraCB-(81)	17.0	28.8	0.0003	0.00871	1.44
233'44'-PentaCB-(105)	39.8	67.5	0.00003	0.00204	0.336
2344'5-PentaCB-(114)	9.86	16.7	0.00003	0.000505	0.0833
23'44'5-PentaCB-(118)	87.4	148	0.00003	0.00448	0.739
23'44'5'-PentaCB-(123)	10.9	18.5	0.00003	0.000558	0.0921
33'44'5-PentaCB-(126)	9.26	15.7	0.1	1.58	261
HexaCB-(156)+(157)	18.8	31.9	0.00003	0.000963	0.159
23'44'55'-HexaCB-(167)	14.4	24.4	0.00003	0.000737	0.122
33'44'55'-HexaCB-(169)	15.4	26.1	0.03	0.789	130
233'44'55'-HeptaCB-(189)	18.0	30.5	0.00003	0.0009	0.152
			Total Toxic Equivalency	16.6	2740

<u>Notes:</u>

[1] Sampling followed Environment Canada Method RM/2 (Dioxin and Furans)

[2] All referenced concentration values are expressed at 101.3kPa, 25 ^{o} C, and 11% Oxygen

[3] Average of three tests

[4] When laboratory analysis was below the detection limit, this detection limit was used to calculate the concentration and emission rate.

**CCD = Chloro Dibenzo-p-Dioxin,*

***CDF = chlorodibenzo-p-furan*

****CB = chlorobenzene*

Detailed sampling results including individual test results can be found in Appendix D

Table 5B: Dioxins and Furans - Averaged Results - Alt. Fuel Oct.
Kiln

	Average Concentration	Average Concentration @25 °C and 11 % O_2	Reg 419 Toxic Equivalency Factors		
			TEF	TEF Concentration	TEF Emission Rate
Parameter	**(pg/m^3)**	**(pg/m^3)**		**(pg TEQ/m^3)**	**(pg/s)**
2,3,7,8-Tetra CDD*	4.25	7.56	1.00	7.56	1150
1,2,3,7,8-Penta CDD	2.69	4.78	1.00	4.78	728
1,2,3,4,7,8-Hexa CDD	1.75	3.12	0.10	0.312	47.5
1,2,3,6,7,8-Hexa CDD	1.72	3.05	0.10	0.305	46.5
1,2,3,7,8,9-Hexa CDD	1.61	2.87	0.10	0.287	43.7
1,2,3,4,6,7,8-Hepta CDD	1.72	3.05	0.01	0.0305	4.65
1,2,3,4,6,7,8,9-Octa CDD	2.834	5.04	0.0003	0.00151	0.23
2,3,7,8-Tetra CDF**	4.94	8.79	0.10	0.879	134.0
1,2,3,7,8-Penta CDF	1.78	3.16	0.03	0.0949	14.4
2,3,4,7,8-Penta CDF	1.80	3.19	0.30	0.958	146
1,2,3,4,7,8-Hexa CDF	1.98	3.52	0.10	0.352	53.6
1,2,3,6,7,8-Hexa CDF	1.944	3.46	0.10	0.346	52.7
2,3,4,6,7,8-Hexa CDF	2.11	3.75	0.10	0.375	57.1
1,2,3,7,8,9-Hexa CDF	2.456	4.37	0.10	0.437	66.5
1,2,3,4,6,7,8-Hepta CDF	1.86	3.30	0.01	0	5.03
1,2,3,4,7,8,9-Hepta CDF	2.055	3.65	0.01	0.0365	5.57
1,2,3,4,6,7,8,9-Octa CDF	1.927	3.43	0.0003	0.00103	0.157
33'44'-TetraCB-(77)***	32.9	58.42	0.0001	0.00584	0.890
344'5-TetraCB-(81)	17.8	31.64	0.0003	0.00949	1.45
233'44'-PentaCB-(105)	66.7	118.66	0.00003	0.00356	0.542
2344'5-PentaCB-(114)	12.7	22.52	0.00003	0.000675	0.103
23'44'5-PentaCB-(118)	221	393.04	0.00003	0.01180	1.8
23'44'5'-PentaCB-(123)	14.0	24.83	0.00003	0.000745	0.113
33'44'5-PentaCB-(126)	11.2	19.90	0.1	1.99	303
HexaCB-(156)+(157)	20.4	36.21	0.00003	0.00109	0.165
23'44'55'-HexaCB-(167)	15.52	27.60	0.00003	0.000828	0.126
33'44'55'-HexaCB-(169)	14.9	26.53	0.03	0.796	121
233'44'55'-HeptaCB-(189)	10.3	18.35	0.00003	0.00055	0.0839
			Total Toxic Equivalency	19.6	2990

Notes:

[1] Sampling followed Environment Canada Method RM/2 (Dioxin and Furans)

[2] All referenced concentration values are expressed at 101.3kPa, 25 ° C, and 11% Oxygen

[3] Average of three tests

[4] When laboratory analysis was below the detection limit, this detection limit was used to calculate the concentration and emission rate.

**CCD = Chloro Dibenzo-p-Dioxin,*

***CDF = chlorodibenzo-p-furan*

****CB = chlorobenzene*

Detailed sampling results including individual test results can be found in Appendix D

Table 5C: Dioxins and Furans - Averaged Results - Alt. Fuel Dec.

Kiln

	Average Concentration	Average Concentration @25 °C and 11 % O_2	Reg 419 Toxic Equivalency Factors		
			TEF	TEF Concentration	TEF Emission Rate
Parameter	**(pg/m^3)**	**(pg/m^3)**		**(pg TEQ/m^3)**	**(pg/s)**
2,3,7,8-Tetra CDD*	1.64	2.15	1.00	2.15	465
1,2,3,7,8-Penta CDD	1.72	2.25	1.00	2.25	487
1,2,3,4,7,8-Hexa CDD	1.65	2.16	0.10	0.216	46.8
1,2,3,6,7,8-Hexa CDD	1.71	2.24	0.10	0.224	48.4
1,2,3,7,8,9-Hexa CDD	1.54	2.01	0.10	0.201	43.6
1,2,3,4,6,7,8-Hepta CDD	2.03	2.66	0.01	0.0266	5.75
1,2,3,4,6,7,8,9-Octa CDD	6.48	8.48	0.0003	0.00254	0.55
2,3,7,8-Tetra CDF**	2.02	2.64	0.10	0.264	57.2
1,2,3,7,8-Penta CDF	1.90	2.49	0.03	0.0746	16.1
2,3,4,7,8-Penta CDF	1.67	2.18	0.30	0.655	142
1,2,3,4,7,8-Hexa CDF	1.64	2.15	0.10	0.215	46.4
1,2,3,6,7,8-Hexa CDF	1.62	2.12	0.10	0.212	45.9
2,3,4,6,7,8-Hexa CDF	1.58	2.07	0.10	0.207	44.7
1,2,3,7,8,9-Hexa CDF	1.96	2.56	0.10	0.256	55.5
1,2,3,4,6,7,8-Hepta CDF	1.81	2.37	0.01	0.0237	5.13
1,2,3,4,7,8,9-Hepta CDF	1.76	2.30	0.01	0.023	4.98
1,2,3,4,6,7,8,9-Octa CDF	2.23	2.92	0.0003	0.000875	0.189
33'44'-TetraCB-(77)***	18.0	23.6	0.0001	0.00236	0.510
344'5-TetraCB-(81)	14.2	18.6	0.0003	0.00557	1.21
233'44'-PentaCB-(105)	44.7	58.5	0.00003	0.00175	0.380
2344'5-PentaCB-(114)	8.0	10.4	0.00003	0.000313	0.0677
23'44'5-PentaCB-(118)	133	174	0.00003	0.00522	1.13
23'44'5'-PentaCB-(123)	8.8	11.5	0.00003	0.000345	0.0748
33'44'5-PentaCB-(126)	7.6	9.9	0.1	0.988	214
HexaCB-(156)+(157)	22.5	29.4	0.00003	0.000883	0.191
23'44'55'-HexaCB-(167)	17.2	22.5	0.00003	0.000675	0.146
33'44'55'-HexaCB-(169)	18.7	24.5	0.03	0.734	159
233'44'55'-HeptaCB-(189)	20.0	26.2	0.00003	0.00079	0.17
			Total Toxic Equivalency	8.7	1890

<u>Notes:</u>

[1] Sampling followed Environment Canada Method RM/2 (Dioxin and Furans)

[2] All referenced concentration values are expressed at 101.3kPa, 25 ^{o} C, and 11% Oxygen

[3] Average of three tests

[4] When laboratory analysis was below the detection limit, this detection limit was used to calculate the concentration and emission rate.

**CCD = Chloro Dibenzo-p-Dioxin,*

***CDF = chlorodibenzo-p-furan*

****CB = chlorobenzene*

Detailed sampling results including individual test results can be found in Appendix D

Table 5D: Dioxins and Furans - Averaged Results - Baseline Dec.
Kiln

Kiln Baseline	Average Concentration	Average Concentration @25 °C and 11 % O_2	Reg 419 Toxic Equivalency Factors		
			TEF	TEF Concentration	TEF Emission Rate
Parameter	**(pg/m^3)**	**(pg/m^3)**		**(pg TEQ/m^3)**	**(pg/s)**
2,3,7,8-Tetra CDD*	1.67	2.39	1.00	2.39	483
1,2,3,7,8-Penta CDD	1.65	2.36	1.00	2.36	478
1,2,3,4,7,8-Hexa CDD	1.66	2.37	0.10	0.237	48.1
1,2,3,6,7,8-Hexa CDD	1.69	2.41	0.10	0.241	48.8
1,2,3,7,8,9-Hexa CDD	1.56	2.23	0.10	0.223	45.1
1,2,3,4,6,7,8-Hepta CDD	1.68	2.40	0.01	0.024	4.85
1,2,3,4,6,7,8,9-Octa CDD	2.55	3.64	0.0003	0.00109	0.221
2,3,7,8-Tetra CDF**	1.62	2.31	0.10	0.231	46.8
1,2,3,7,8-Penta CDF	1.69	2.41	0.03	0.0724	14.6
2,3,4,7,8-Penta CDF	1.69	2.41	0.30	0.724	146
1,2,3,4,7,8-Hexa CDF	1.53	2.18	0.10	0.218	44.2
1,2,3,6,7,8-Hexa CDF	1.51	2.16	0.10	0.216	43.6
2,3,4,6,7,8-Hexa CDF	1.60	2.28	0.10	0.228	46.2
1,2,3,7,8,9-Hexa CDF	1.75	2.50	0.10	0.25	50.6
1,2,3,4,6,7,8-Hepta CDF	1.26	1.80	0.01	0.018	3.64
1,2,3,4,7,8,9-Hepta CDF	1.57	2.24	0.01	0.0224	4.54
1,2,3,4,6,7,8,9-Octa CDF	1.64	2.34	0.0003	0.000703	0.142
33'44'-TetraCB-(77)***	17.1	24.4	0.0001	0.00244	0.494
344'5-TetraCB-(81)	16.8	24.0	0.0003	0.0072	1.46
233'44'-PentaCB-(105)	21.6	30.8	0.00003	0.000925	0.187
2344'5-PentaCB-(114)	8.80	12.6	0.00003	0.000377	0.0763
23'44'5-PentaCB-(118)	61.4	88	0.00003	0.00263	0.532
23'44'5'-PentaCB-(123)	9.8	14.0	0.00003	0.00042	0.085
33'44'5-PentaCB-(126)	8.39	12.0	0.1	1.2	242
HexaCB-(156)+(157)	19.8	28.3	0.00003	0.000848	0.172
23'44'55'-HexaCB-(167)	18.5	26.4	0.00003	0.000792	0.16
33'44'55'-HexaCB-(169)	19.7	28.1	0.03	0.844	171
233'44'55'-HeptaCB-(189)	19.7	28.1	0.00003	0.0008	0.171
			Total Toxic Equivalency	9.5	1930

Notes:
[1] Sampling followed Environment Canada Method RM/2 (Dioxin and Furans)
[2] All referenced concentration values are expressed at 101.3kPa, 25 ° C, and 11% Oxygen
[3] Average of three tests
[4] When laboratory analysis was below the detection limit, this detection limit was used to calculate the concentration and emission rate.
**CCD = Chloro Dibenzo-p-Dioxin,*
***CDF = chlorodibenzo-p-furan*
****CB = chlorobenzene*
Detailed sampling results including individual test results can be found in Appendix D

Table 6A - Polycyclic Aromatic Hydrocarbons (PAH's) - Baseline Oct.

Kiln

Parameter	Concentration	Concentration @ 11% O_2	Emission Rate
PAH	**(µg/m^3)**	**(µg/m^3)**	**(µg/s)**
1-Methylnaphthalene	79.8	135	22693
1-Methylphenanthrene	0.224	0.380	63.8
2-Chloronaphthalene	1.38	2.34	394
2-Methylanthracene	< 0.0765	< 0.130	< 21.8
2-Methylnaphthalene	111	188	31711
3-Methylcholanthrene	< 0.0765	< 0.130	< 21.8
7,12-Dimethylbenzo(a)anthracene	< 0.306	< 0.519	< 87.0
9,10-Dimethylanthracene	< 0.0765	< 0.130	< 21.8
9-Methylphenanthrene	0.515	0.873	146.6
Acenaphthene	1.580	2.678	451
Acenaphthylene	1.97	3.34	562
Anthracene	0.15	0.25	42
Benzo(a)anthracene	0.077	0.130	21.8
Benzo(a)fluorene	< 0.0765	< 0.130	< 21.8
Benzo(a)pyrene	< 0.0765	< 0.130	< 21.8
Benzo(b)fluoranthene	< 0.0765	< 0.130	< 21.8
Benzo(b)fluorene	< 0.08	< 0.130	< 21.8
Benzo(e)pyrene	< 0.0765	< 0.130	< 21.8
Benzo(g,h,i)perylene	< 0.0765	< 0.130	< 21.8
Benzo(k)fluoranthene	< 0.0765	< 0.130	< 21.8
Chrysene	< 0.0765	< 0.130	< 21.8
Coronene	< 0.0765	< 0.130	< 21.8
Dibenzo(a,c)anthracene	< 0.0765	< 0.130	< 21.8
Fluoranthene	< 0.0765	< 0.130	< 21.8
Fluorene	0.7550	1.28	215
Indeno(1,2,3-cd)pyrene	< 0.0765	< 0.130	< 21.8
Naphthalene	< 191.0000	< 324	< 54198
Perylene	< 0.0765	< 0.130	< 21.8
Phenanthrene	< 3.2	< 5.475	< 919.4
Picene	0.0765	0.1	21.8
Pyrene	0.08	0.1	21.8
Tetralin	< 49.70	< 84.2	< 14135
Triphenylene	0.08	0.130	21.8
1,2,3,4-Tetrachlorobenzene	< 0.08	< 0.130	< 21.8
1,2,3,5+1,2,4,5-Tetrachlorobenzen	< 0.08	< 0.130	< 21.8
1,2,3-Trichlorobenzene	0.46	0.773	130.5
1,2,4-Trichlorobenzene	< 0.40	< 0.680	< 114.1
1,2-Dichlorobenzene	< 1.7600	< 2.983	< 498.9
1,3,5-Trichlorobenzene	< 0.0841	< 0.143	< 23.9
1,3-Dichlorobenzene	0.541	0.917	154
1,4-Dichlorobenzene	0.418	0.708	119
Hexachlorobenzene	0.08	0.13	21.8
Pentachlorobenzene	< 0.0765	< 0.130	< 21.8
2,3,4,5-Tetrachlorophenol	0.077	0.130	21.8
2,3,4,6-Tetrachlorophenol	0.077	0.130	21.8
2,3,4-Trichlorophenol	< 0.0765	< 0.130	< 21.8
2,3,5,6-Tetrachlorophenol	< 0.0765	< 0.130	< 21.8
2,3,5-Trichlorophenol	< 0.0765	< 0.130	< 21.8
2,3,6-Trichlorophenol	< 0.0765	< 0.130	< 21.8
2,3-Dichlorophenol	< 0.0765	< 0.130	< 21.8
2,4 + 2,5-Dichlorophenol	< 0.0765	< 0.130	< 21.8
2,4,5-Trichlorophenol	< 0.0765	< 0.130	< 21.8
2,4,6-Trichlorophenol	< 0.0765	< 0.130	< 21.8
2,6-Dichlorophenol	< 0.0765	< 0.130	< 21.8
2-Chlorophenol	< 1.8300	< 3.102	< 521
3,4,5-Trichlorophenol	< 0.0765	< 0.130	< 21.8
3,4-Dichlorophenol	< 0.0765	< 0.130	< 21.8
3,5-Dichlorophenol	< 0.0765	< 0.130	< 21.8
3-Chlorophenol	0.287	0.486	81.6
4-Chlorophenol	< 0.4120	< 0.698	< 117
Pentachlorophenol	< 0.0765	< 0.130	< 21.8

Notes:

[1] Sample volume and volumetric flow rate based on dry referenced conditions (101.3kPa, and 25°C)

'<' indicates that laboratory results were below the detection limit. The detection limit was used to calculate the concentration and emission rate.

Table 6B - Polycyclic Aromatic Hydrocarbons (PAH's) - Alt. Fuel Oct.

Kiln

Parameter	Concentration	Concentration @ 11% O_2	Emission Rate
PAH	**(µg/m^3)**	**(µg/m^3)**	**(µg/s)**
1-Methylnaphthalene	87.7	154	24000
1-Methylphenanthrene	1.28	2.25	350
2-Chloronaphthalene	1.85	3.25	504
2-Methylanthracene	< 0.0781	< 0.14	< 21.4
2-Methylnaphthalene	128	225	34900
3-Methylcholanthrene	< 0.0781	< 0.14	< 21.4
7,12-Dimethylbenzo(a)anthracene	< 0.312	< 0.55	< 85.4
9,10-Dimethylanthracene	< 0.0781	< 0.14	< 21.4
9-Methylphenanthrene	3.08	5.40	840
Acenaphthene	2.09	3.67	570
Acenaphthylene	3.30	5.79	902
Anthracene	0.359	0.63	97.8
Benzo(a)anthracene	< 0.0781	< 0.137	< 21.4
Benzo(a)fluorene	< 0.0781	< 0.137	< 21.4
Benzo(a)pyrene	< 0.0781	< 0.137	< 21.4
Benzo(b)fluoranthene	< 0.0781	< 0.137	< 21.4
Benzo(b)fluorene	< 0.0781	< 0.137	< 21.4
Benzo(e)pyrene	< 0.0781	< 0.137	< 21.4
Benzo(g,h,i)perylene	< 0.0781	< 0.137	< 21.4
Benzo(k)fluoranthene	< 0.0781	< 0.137	< 21.4
Chrysene	< 0.0781	< 0.137	< 21.4
Coronene	< 0.0781	< 0.137	< 21.4
Dibenzo(a,c)anthracene	< 0.0781	< 0.137	< 21.4
Fluoranthene	0.161	0.282	43.8
Fluorene	2.21	3.88	604
Indeno(1,2,3-cd)pyrene	< 0.0781	< 0.14	< 21.4
Naphthalene	170	298	46400
Perylene	< 0.0781	< 0.14	< 21.4
Phenanthrene	12.7	22.28	3460
Picene	< 0.0781	< 0.137	< 21.4
Pyrene	< 0.0988	< 0.173	< 27.0
Tetralin	45.2	79.30	12400
Triphenylene	< 0.0781	< 0.137	< 21.4
1,2,3,4-Tetrachlorobenzene	< 0.0781	< 0.137	< 21.4
1,2,3,5+1,2,4,5-Tetrachlorobenzene	< 0.0781	< 0.137	< 21.4
1,2,3-Trichlorobenzene	1.280	2.25	349
1,2,4-Trichlorobenzene	0.735	1.29	201
1,2-Dichlorobenzene	1.68	2.95	460
1,3,5-Trichlorobenzene	< 0.0781	< 0.14	< 21.4
1,3-Dichlorobenzene	0.817	1.43	223
1,4-Dichlorobenzene	0.547	0.960	150
Hexachlorobenzene	< 0.0781	< 0.137	< 21.4
Pentachlorobenzene	< 0.0781	< 0.137	< 21.4
2,3,4,5-Tetrachlorophenol	< 0.0781	< 0.137	< 21.4
2,3,4,6-Tetrachlorophenol	< 0.0781	< 0.137	< 21.4
2,3,4-Trichlorophenol	< 0.0781	< 0.137	< 21.4
2,3,5,6-Tetrachlorophenol	< 0.0781	< 0.137	< 21.4
2,3,5-Trichlorophenol	< 0.0781	< 0.137	< 21.4
2,3,6-Trichlorophenol	< 0.0781	< 0.137	< 21.4
2,3-Dichlorophenol	0.0789	0.138	21.6
2,4 + 2,5-Dichlorophenol	0.180	0.316	49.3
2,4,5-Trichlorophenol	< 0.0781	< 0.137	< 21.4
2,4,6-Trichlorophenol	< 0.0781	< 0.137	< 21.4
2,6-Dichlorophenol	0.0815	0.143	22.3
2-Chlorophenol	4.73	8.30	1290
3,4,5-Trichlorophenol	< 0.0781	< 0.137	< 21.4
3,4-Dichlorophenol	< 0.0781	< 0.137	< 21.4
3,5-Dichlorophenol	< 0.0781	< 0.137	< 21.4
3-Chlorophenol	1.070	1.88	293
4-Chlorophenol	1.020	1.79	278
Pentachlorophenol	< 0.0781	< 0.137	< 21.4

Notes:

[1] Sample volume and volumetric flow rate based on dry referenced conditions (101.3kPa, and 25°C)

'<' indicates that laboratory results were below the detection limit. The detection limit was used to calculate the concentration and emission rate.

Table 6C - Polycyclic Aromatic Hydrocarbons (PAH's) - Alt. Fuel Dec.

Kiln

Parameter	Concentration	Concentration @ 11% O_2	Emission Rate
PAH	**(µg/m^3)**	**(µg/m^3)**	**(µg/s)**
1-Methylnaphthalene	76.7	100	21900
1-Methylphenanthrene	0.25	0.319	71
2-Chloronaphthalene	1.05	1.37	299
2-Methylanthracene	< 0.0758	< 0.099	< 21.7
2-Methylnaphthalene	113	147	32400
3-Methylcholanthrene	< 0.0758	< 0.099	< 21.7
7,12-Dimethylbenzo(a)anthracene	< 0.303	< 0.395	< 86.7
9,10-Dimethylanthracene	< 0.0758	< 0.099	< 21.7
9-Methylphenanthrene	0.60	0.776	171.0
Acenaphthene	1.20	1.56	342.0
Acenaphthylene	1.61	2.10	459.0
Anthracene	< 0.091	< 0.1181	< 26.0
Benzo(a)anthracene	< 0.0758	< 0.0988	< 21.7
Benzo(a)fluorene	< 0.0758	< 0.0988	< 21.7
Benzo(a)pyrene	< 0.0758	< 0.0988	< 21.7
Benzo(b)fluoranthene	< 0.0758	< 0.0988	< 21.7
Benzo(b)fluorene	< 0.0758	< 0.0988	< 21.7
Benzo(e)pyrene	< 0.0758	< 0.0988	< 21.7
Benzo(g,h,i)perylene	< 0.0758	< 0.0988	< 21.7
Benzo(k)fluoranthene	< 0.0758	< 0.0988	< 21.7
Chrysene	< 0.0758	< 0.0988	< 21.7
Coronene	< 0.0758	< 0.0988	< 21.7
Dibenzo(a,c)anthracene	< 0.0758	< 0.0988	< 21.7
Fluoranthene	< 0.076	< 0.0988	< 21.7
Fluorene	0.65	0.8526	187
Indeno(1,2,3-cd)pyrene	< 0.0758	< 0.10	< 21.7
Naphthalene	173	226	49400
Perylene	< 0.0758	< 0.0988	< 21.7
Phenanthrene	2.6	3.43	754
Picene	< 0.0758	< 0.099	< 21.7
Pyrene	< 0.0758	< 0.099	< 21.7
Tetralin	46.9	61.1	13400
Triphenylene	< 0.0758	< 0.0988	< 21.7
1,2,3,4-Tetrachlorobenzene	< 0.0758	< 0.0988	< 21.7
1,2,3,5+1,2,4,5-Tetrachlorobenzene	< 0.0758	< 0.0988	< 21.7
1,2,3-Trichlorobenzene	0.351	0.458	100
1,2,4-Trichlorobenzene	0.397	0.518	114
1,2-Dichlorobenzene	1.26	1.64	359
1,3,5-Trichlorobenzene	< 0.0758	< 0.0988	< 21.7
1,3-Dichlorobenzene	0.598	0.780	170
1,4-Dichlorobenzene	0.697	0.909	199
Hexachlorobenzene	< 0.0758	< 0.0988	< 21.7
Pentachlorobenzene	< 0.0758	< 0.0988	< 21.7
2,3,4,5-Tetrachlorophenol	< 0.0758	< 0.0988	< 21.7
2,3,4,6-Tetrachlorophenol	< 0.0758	< 0.0988	< 21.7
2,3,4-Trichlorophenol	< 0.0758	< 0.0988	< 21.7
2,3,5,6-Tetrachlorophenol	< 0.0758	< 0.0988	< 21.7
2,3,5-Trichlorophenol	< 0.0758	< 0.0988	< 21.7
2,3,6-Trichlorophenol	< 0.0758	< 0.0988	< 21.7
2,3-Dichlorophenol	< 0.0758	< 0.0988	< 21.7
2,4 + 2,5-Dichlorophenol	0.122	0.1591	34.9
2,4,5-Trichlorophenol	< 0.0758	< 0.0988	< 21.7
2,4,6-Trichlorophenol	< 0.0758	< 0.0988	< 21.7
2,6-Dichlorophenol	< 0.0758	< 0.0988	< 21.7
2-Chlorophenol	5.00	6.52	1430
3,4,5-Trichlorophenol	< 0.0758	< 0.099	< 21.7
3,4-Dichlorophenol	< 0.0758	< 0.099	< 21.7
3,5-Dichlorophenol	< 0.0857	< 0.112	< 24.5
3-Chlorophenol	0.576	0.751	165
4-Chlorophenol	0.457	0.596	131
Pentachlorophenol	< 0.0758	< 0.099	< 21.7

Notes:

[1] Sample volume and volumetric flow rate based on dry referenced conditions (101.3kPa, and 25°C)

'<' indicates that laboratory results were below the detection limit. The detection limit was used to calculate the concentration and emission rate.

Table 6D - Polycyclic Aromatic Hydrocarbons (PAH's) - Baseline Dec.

Kiln

Parameter	Concentration	Concentration @ 11% O_2	Emission Rate
PAH	**(µg/m³)**	**(µg/m³)**	**(µg/s)**
1-Methylnaphthalene	73.4	105	21400
1-Methylphenanthrene	0.194	0.277	56.5
2-Chloronaphthalene	1.25	1.79	365
2-Methylanthracene	< 0.0744	< 0.106	< 21.7
2-Methylnaphthalene	115	164	33400
3-Methylcholanthrene	< 0.0744	< 0.106	< 21.7
7,12-Dimethylbenzo(a)anthracene	< 0.298	< 0.426	< 86.9
9,10-Dimethylanthracene	< 0.0744	< 0.106	< 21.7
9-Methylphenanthrene	0.428	0.611	125
Acenaphthene	1.26	1.80	366
Acenaphthylene	2.62	3.74	760
Anthracene	< 0.095	< 0.135	< 27.5
Benzo(a)anthracene	< 0.0744	< 0.106	< 21.7
Benzo(a)fluorene	< 0.0744	< 0.106	< 21.7
Benzo(a)pyrene	< 0.0744	< 0.106	< 21.7
Benzo(b)fluoranthene	< 0.0744	< 0.106	< 21.7
Benzo(b)fluorene	< 0.0744	< 0.106	< 21.7
Benzo(e)pyrene	< 0.0744	< 0.106	< 21.7
Benzo(g,h,i)perylene	< 0.0744	< 0.106	< 21.7
Benzo(k)fluoranthene	< 0.0744	< 0.106	< 21.7
Chrysene	< 0.0744	< 0.106	< 21.7
Coronene	< 0.0744	< 0.106	< 21.7
Dibenzo(a,c)anthracene	< 0.0744	< 0.106	< 21.7
Fluoranthene	< 0.0744	< 0.106	< 21.7
Fluorene	0.701	1.00	204
Indeno(1,2,3-cd)pyrene	< 0.0744	< 0.106	< 21.7
Naphthalene	163	233	47500
Perylene	< 0.0744	< 0.106	< 21.7
Phenanthrene	2.56	3.66	746
Picene	< 0.0744	< 0.106	< 21.7
Pyrene	< 0.0744	< 0.106	< 21.7
Tetralin	40.9	58.4	11900
1,4-Dichlorobenzene	0.9230	1.319	269
Hexachlorobenzene	< 0.0744	< 0.106	< 21.7
Pentachlorobenzene	< 0.074	< 0.106	< 22
2,3,4,5-Tetrachlorophenol	< 0.223	< 0.319	< 65
2,3,4,6-Tetrachlorophenol	< 0.22	< 0.32	< 65
2,3,4-Trichlorophenol	< 0.2230	< 0.319	< 65.2
2,3,5,6-Tetrachlorophenol	< 0.223	< 0.319	< 65
2,3,5-Trichlorophenol	< 0.223	< 0.319	< 65
2,3,6-Trichlorophenol	< 0.2230	< 0.319	< 65.2
2,3-Dichlorophenol	< 0.2230	< 0.319	< 65.2
2,4 + 2,5-Dichlorophenol	< 0.2560	< 0.366	< 74.8
2,4,5-Trichlorophenol	< 0.2230	< 0.319	< 65.2
2,4,6-Trichlorophenol	< 0.2230	< 0.319	< 65.2
2,6-Dichlorophenol	< 0.2230	< 0.319	< 65.2
2-Chlorophenol	4.5500	6.500	1330
3,4,5-Trichlorophenol	< 0.2230	< 0.319	< 65.2
3,4-Dichlorophenol	< 0.2230	< 0.319	< 65.2
3,5-Dichlorophenol	< 0.2230	< 0.319	< 65.2
3-Chlorophenol	0.7290	1.041	213
4-Chlorophenol	0.6000	0.857	175
Pentachlorophenol	< 0.2230	< 0.319	< 65.2

Notes:

[1] Sample volume and volumetric flow rate based on dry referenced conditions (101.3kPa, and 25°C)

'<' indicates that laboratory results were below the detection limit. The detection limit was used to calculate the concentration and emission rate.

Table 7A - Summary of PM_{10} and $PM_{2.5}$ Results

Baseline Oct.

Test	Date	PM_{10} Concentration mg/m^3	PM_{10} Emission Rate g/sec	$PM_{2.5}$ Concentration mg/m^3	$PM_{2.5}$ Emission Rate g/sec
1	30-Sep-18	1.64	0.465	0.597	0.169
2	1-Oct-18	1.65	0.469	0.598	0.170
3	2-Oct-18	1.58	0.449	0.750	0.214
Average		1.62	0.461	0.648	0.184

Table 7B - Summary of PM_{10} and $PM_{2.5}$ Results

Alt Fuels Oct.

Test	Date	PM_{10} Concentration mg/m^3	PM_{10} Emission Rate g/sec	$PM_{2.5}$ Concentration mg/m^3	$PM_{2.5}$ Emission Rate g/sec
1	10-Oct-18	2.05	0.547	0.708	0.189
2	12-Oct-18	1.82	0.531	0.868	0.254
3	12-Oct-18	2.60	0.719	1.070	0.296
Average		2.15	0.599	0.882	0.246

Table 7C - Summary of PM_{10} and $PM_{2.5}$ Results

Alt Fuels Dec.

Test	Date	PM_{10} Concentration mg/m^3	PM_{10} Emission Rate g/sec	$PM_{2.5}$ Concentration mg/m^3	$PM_{2.5}$ Emission Rate g/sec
1	4-Dec-18	1.60	0.435	0.685	0.186
2	5-Dec-18	1.89	0.533	0.840	0.237
3	6-Dec-18	2.02	0.556	0.778	0.214
Average		1.84	0.508	0.767	0.212

Table 7D - Summary of PM_{10} and $PM_{2.5}$ Results

Baseline Dec.

Test	Date	PM_{10} Concentration mg/m^3	PM_{10} Emission Rate g/sec	$PM_{2.5}$ Concentration mg/m^3	$PM_{2.5}$ Emission Rate g/sec
1	7-Dec-18	1.43	0.397	0.604	0.167
2	7-Dec-18	1.28	0.357	0.675	0.189
3	8-Dec-18	1.45	0.403	0.608	0.169
Average		1.39	0.386	0.629	0.175

Table 8A: HCl and Ammonia - Averaged Results - Baseline Oct.
Kiln

Parameter	Concentration	Concentration @ 11% O_2	Emission Rate
PAH	**(mg/m^3)**	**(mg/m^3)**	**(g/s)**
Hydrochloric Acid	5.18	8.78	1.45
Ammonia (NH_3)	21.2	35.9	5.95

Notes:

[1] Sample volume and volumetric flow rate based on dry referenced conditions (101.3kPa, 25 ^{o} C)

[1] Flow rate based on average of isokentic tests conducted that day

Lab results for Ammonium converted to ammonia used molecular wts (17/18)

Table 8B: HCl and Ammonia - Averaged Results - Alt. Fuel Oct.
Kiln

Parameter	Concentration	Concentration @ 11% O_2	Emission Rate
PAH	**(mg/m^3)**	**(mg/m^3)**	**(g/s)**
Hydrochloric Acid	3.46	6.07	0.949
Ammonia (NH_3)	14.9	26.1	4.07

Notes:

[1] Sample volume and volumetric flow rate based on dry referenced conditions (101.3kPa, 25 ^{o} C)

[1] Flow rate based on average of isokentic tests conducted that day

Lab results for Ammonium converted to ammonia used molecular wts (17/18)

Table 8C: HCl and Ammonia - Averaged Results - Alt. Fuel Dec.
Kiln

Parameter	Concentration	Concentration @ 11% O_2	Emission Rate
PAH	**(mg/m^3)**	**(mg/m^3)**	**(g/s)**
Hydrochloric Acid	5.84	7.61	1.67
Ammonia (NH_3)	18.3	23.9	5.22

Notes:

[1] Sample volume and volumetric flow rate based on dry referenced conditions (101.3kPa, 25 ^{o} C)

[1] Flow rate based on average of isokentic tests conducted that day

Lab results for Ammonium converted to ammonia used molecular wts (17/18)

Table 8D: HCl and Ammonia - Averaged Results - Baseline Dec.

Kiln

Parameter	Concentration	Concentration @ 11% O_2	Emission Rate
PAH	**(mg/m^3)**	**(mg/m^3)**	**(g/s)**
Hydrochloric Acid	2.09	2.99	0.603
Ammonia (NH_3)	14.0	20.0	4.06

Notes:

[1] Sample volume and volumetric flow rate based on dry referenced conditions (101.3kPa, 25 ^{o} C)

[1] Flow rate based on average of isokentic tests conducted that day

Lab results for Ammonium converted to ammonia used molecular wts (17/18)

Table 9A - Volatile Organic Compound - Baseline Oct.

Kiln

Parameter	Concentration	Concentration @ 11% O_2	Emission Rate
	($\mu g/m^3$)	($\mu g/m^3$)	(mg/s)
Chloromethane	260	441	73.1
Vinyl Chloride	< 0.7	< 1.18	< 0.196
Bromomethane	< 14.6	< 24.7	< 4.10
Chloroethane	29.3	49.7	8.22
Acetone (2-Propanone)	348.99	592	98.2
1,1-Dichloroethylene	< 0.590	< 1.00	< 0.166
Methylene Chloride(Dichloromethane)	< 1.02	< 1.73	< 0.287
1,1-Dichloroethane	< 0.644	< 1.09	< 0.181
trans-1,2-Dichloroethylene	< 0.537	< 0.910	< 0.151
cis-1,2-Dichloroethylene	< 0.537	< 0.910	< 0.151
Chloroform	< 0.590	< 1.00	< 0.166
1,2-Dichloroethane	< 0.376	< 0.637	< 0.106
Methyl Ethyl Ketone (2-Butanone)	< 1.930	< 3.27	< 0.543
1,1,1-Trichloroethane	< 0.751	< 1.27	< 0.211
Carbon Tetrachloride	< 0.858	< 1.45	< 0.241
Benzene	863	1463	244.0
1,1,2-Trichloroethane	< 0.858	< 1.45	< 0.241
1,2-Dichloropropane	< 0.590	< 1.00	< 0.166
Trichloroethylene	< 0.590	< 1.00	< 0.166
Bromodichloromethane	< 0.590	< 1.00	< 0.166
Dibromochloromethane	< 0.483	< 0.819	< 0.136
Toluene	497.0	842	140.0
Ethylene Dibromide	< 0.537	< 0.910	< 0.151
Tetrachloroethylene	< 0.966	< 1.64	< 0.272
Chlorobenzene	19.9	33.7	5.60
1,1,1,2-Tetrachloroethane	< 0.537	< 0.91	< 0.151
Ethylbenzene	115	195	32.3
m / p-Xylene	435	737	123
Styrene	121	205	34.2
o-Xylene	171	290	48.2
Bromoform	< 0.751	< 1.27	< 0.211
1,1,2,2-Tetrachloroethane	< 0.751	< 1.27	< 0.211
Cumene	< 231	< 391.5	< 64.1

Notes:

'<' indicates that the laboratory results were less than the Reportable Detection Limit (RDL). This RDL was used to calculate the concentration and emission rate.

[1] Sample volume, volumetric flow rate, and concentration based on dry referenced conditions (101.3 kPa, 25 °C, and Actual Oxygen)

[2] Average of the measured volumetric flow rates from isokinetic testing that day

Table 9B - Volatile Organic Compound - Alt. Fuels Oct.

Kiln

Parameter	Concentration	Concentration @ 11% O_2	Emission Rate
	(µg/m^3)	(µg/m^3)	(mg/s)
Chloromethane	242	425	66.3
Vinyl Chloride	< 3.69	< 6.47	< 1.010
Bromomethane	< 4.7	< 8.30	< 1.30
Chloroethane	30.3	53.2	8.28
Acetone (2-Propanone)	323	567	88.5
1,1-Dichloroethylene	< 0.618	< 1.08	< 0.169
Methylene Chloride(Dichloromethan	< 1.07	< 1.87	< 0.292
1,1-Dichloroethane	< 0.674	< 1.18	< 0.185
trans-1,2-Dichloroethylene	< 0.562	< 0.99	< 0.154
cis-1,2-Dichloroethylene	< 0.562	< 0.99	< 0.154
Chloroform	< 0.618	< 1.08	< 0.169
1,2-Dichloroethane	< 0.393	< 0.69	< 0.108
Methyl Ethyl Ketone (2-Butanone)	< 2.02	< 3.55	< 0.554
1,1,1-Trichloroethane	< 0.786	< 1.38	< 0.215
Carbon Tetrachloride	< 0.899	< 1.58	< 0.246
Benzene	919	1612	251
1,1,2-Trichloroethane	< 0.899	< 1.58	< 0.246
1,2-Dichloropropane	< 0.618	< 1.08	< 0.169
Trichloroethylene	< 0.618	< 1.08	< 0.169
Bromodichloromethane	< 0.618	< 1.08	< 0.169
Dibromochloromethane	< 0.506	< 0.89	< 0.138
Toluene	566	993	155
Ethylene Dibromide	< 0.562	< 0.99	< 0.154
Tetrachloroethylene	< 1.011	< 1.77	< 0.277
Chlorobenzene	27.0	47.37	7.39
1,1,1,2-Tetrachloroethane	< 0.562	< 0.986	< 0.154
Ethylbenzene	128	225	35.1
m / p-Xylene	513	900	140
Styrene	142	249	39.0
o-Xylene	196	344	53.7
Bromoform	< 0.786	< 1.38	< 0.215
1,1,2,2-Tetrachloroethane	< 0.786	< 1.38	< 0.215
Cumene	< 42.0	< 73.7	< 11.5

Notes:
'<' indicates that the laboratory results were less than the Reportable Detection Limit (RDL). This RDL was used to calculate the concentration and emission rate.
[1] Sample volume, volumetric flow rate, and concentration based on dry referenced conditions (101.3 kPa, 25 °C, and Actual Oxygen)
[2] Average of the measured volumetric flow rates from isokinetic testing that day

Table 9C - Volatile Organic Compound - Alt. Fuels Dec.

Kiln

Parameter	Concentration	Concentration @ 11% O_2	Emission Rate
	($\mu g/m^3$)	($\mu g/m^3$)	(mg/s)
Chloromethane	320	417	91.2
Vinyl Chloride	< 2.44	< 3.18	< 0.703
Bromomethane	39.2	51.1	11.1
Chloroethane	31.1	40.5	8.90
Acetone (2-Propanone)	431	562	123
1,1-Dichloroethylene	< 0.548	< 0.71	< 0.156
Methylene Chloride(Dichloromethan	< 0.95	< 1.23	< 0.270
1,1-Dichloroethane	< 0.598	< 0.780	< 0.170
trans-1,2-Dichloroethylene	< 0.498	< 0.649	< 0.142
cis-1,2-Dichloroethylene	< 0.498	< 0.649	< 0.142
Chloroform	< 0.548	< 0.714	< 0.156
1,2-Dichloroethane	< 0.349	< 0.455	< 0.099
Methyl Ethyl Ketone (2-Butanone)	< 1.79	< 2.34	< 0.511
1,1,1-Trichloroethane	< 0.697	< 0.909	< 0.199
Carbon Tetrachloride	< 0.797	< 1.04	< 0.227
Benzene	871	1136	248
1,1,2-Trichloroethane	< 0.797	< 1.04	< 0.227
1,2-Dichloropropane	< 0.548	< 0.714	< 0.156
Trichloroethylene	< 0.548	< 0.714	< 0.156
Bromodichloromethane	< 0.548	< 0.714	< 0.156
Dibromochloromethane	< 0.448	< 0.584	< 0.128
Toluene	567	739	161
Ethylene Dibromide	< 0.500	< 0.65	< 0.142
Tetrachloroethylene	< 0.900	< 1.17	< 0.256
Chlorobenzene	28.9	37.7	8.25
1,1,1,2-Tetrachloroethane	< 0.498	< 0.649	< 0.142
Ethylbenzene	131	171	37.3
m / p-Xylene	549	716	156
Styrene	103	134	29.3
o-Xylene	213	278	60.5
Bromoform	< 0.697	< 0.909	< 0.199
1,1,2,2-Tetrachloroethane	< 0.697	< 0.909	< 0.199
Cumene	< 38.9	< 50.7	< 11.1

Notes:

'<' indicates that the laboratory results were less than the Reportable Detection Limit (RDL). This RDL was used to calculate the concentration and emission rate.
[1] Sample volume, volumetric flow rate, and concentration based on dry referenced conditions (101.3 kPa, 25 °C, and Actual Oxygen)
[2] Average of the measured volumetric flow rates from isokinetic testing that day

Table 9D - Volatile Organic Compound - Baseline Dec.

Kiln

Parameter	Concentration	Concentration @ 11% O_2	Emission Rate
	($\mu g/m^3$)	($\mu g/m^3$)	(mg/s)
Chloromethane	354	506	102
Vinyl Chloride	< 0.642	< 0.92	< 0.185
Bromomethane	< 23.3	< 33.3	< 6.76
Chloroethane	30.8	44.0	8.90
Acetone (2-Propanone)	279	399	80.6
1,1-Dichloroethylene	< 0.543	< 0.78	< 0.157
Methylene Chloride(Dichloromethane)	< 0.94	< 1.34	< 0.271
1,1-Dichloroethane	< 0.592	< 0.85	< 0.171
trans-1,2-Dichloroethylene	< 0.493	< 0.70	< 0.143
cis-1,2-Dichloroethylene	< 0.493	< 0.70	< 0.143
Chloroform	< 0.543	< 0.78	< 0.157
1,2-Dichloroethane	< 0.345	< 0.49	< 0.100
Methyl Ethyl Ketone (2-Butanone)	< 1.78	< 2.54	< 0.514
1,1,1-Trichloroethane	< 0.691	< 0.99	< 0.200
Carbon Tetrachloride	< 0.790	< 1.13	< 0.228
Benzene	960	1371	277
1,1,2-Trichloroethane	< 0.790	< 1.129	< 0.228
1,2-Dichloropropane	< 0.543	< 0.78	< 0.157
Trichloroethylene	< 0.543	< 0.78	< 0.157
Bromodichloromethane	< 0.543	< 0.78	< 0.157
Dibromochloromethane	< 0.444	< 0.634	< 0.128
Toluene	720	1029	208
Ethylene Dibromide	< 0.493	< 0.704	< 0.143
Tetrachloroethylene	< 0.888	< 1.27	< 0.257
Chlorobenzene	< 18.2	< 26.0	< 5.21
1,1,1,2-Tetrachloroethane	< 0.493	< 0.704	< 0.143
Ethylbenzene	138	197	39.8
m / p-Xylene	649	927	187
Styrene	137	196	39.7
o-Xylene	247	353	71.2
Bromoform	< 0.691	< 0.99	< 0.200
1,1,2,2-Tetrachloroethane	< 0.691	< 0.99	< 0.200
Cumene	< 49.3	< 70.4	< 14.3

Notes:

'<' indicates that the laboratory results were less than the Reportable Detection Limit (RDL). This RDL was used to calculate the concentration and emission rate.

[1] Sample volume, volumetric flow rate, and concentration based on dry referenced conditions (101.3 kPa, 25 °C, and Actual Oxygen)

[2] Average of the measured volumetric flow rates from isokinetic testing that day

Table 10A- Oxygen, Carbon Monoxide and Carbon Dioxide Results - Baseline Oct.
Kiln

Averaged Results		
O_2 (%)	CO (ppm)	CO_2 (%)
15.1	358.2	11.8

Test ID: 1		Date:	30-Sep-18
Time	O_2 (%)	CO (ppm)	CO_2 (%)
12:06 to 16:25	15.3	367.3	11.4

Test ID: 2		Date:	1-Oct-18
Time	O_2 (%)	CO (ppm)	CO_2 (%)
8:57 to 12:16	14.9	364.6	11.9

Test ID: 3		Date:	2-Oct-18
Time	O_2 (%)	CO (ppm)	CO_2 (%)
8:08 to 12:29	15.1	342.6	12.2

Note:
[1] Sampling followed OSTC Method 3A (Oxygen and Carbon Dioxide)

Table 10B- Oxygen, Carbon Monoxide and Carbon Dioxide Results - Alt. Fuels Oct.
Kiln

Averaged Results		
O_2 (%)	CO (ppm)	CO_2 (%)
15.3	244.7	10.7

Test ID: 1		Date:	10-Oct-18
Time	O_2 (%)	CO (ppm)	CO_2 (%)
16:48 to 18:20	15.6	278.2	11.4

Test ID: 2		Date:	12-Oct-18
Time	O_2 (%)	CO (ppm)	CO_2 (%)
8:48 to 13:13	15.4	222.3	10.3

Test ID: 3		Date:	12-Oct-18
Time	O_2 (%)	CO (ppm)	CO_2 (%)
13:57 to 18:18	15.0	233.7	10.6

Note:
[1] Sampling followed OSTC Method 3A (Oxygen and Carbon Dioxide)

Table 10C - Oxygen, Carbon Monoxide and Carbon Dioxide Results - Alt. Fuels Dec.

Kiln

Averaged Results		
O_2 (%)	CO (ppm)	CO_2 (%)
13.3	307.8	10.9

Test ID: 1		Date:	4-Dec-18
Time	O_2 (%)	CO (ppm)	CO_2 (%)
13:02 to 18:25	13.2	259.3	10.9

Test ID: 2		Date:	5-Dec-18
Time	O_2 (%)	CO (ppm)	CO_2 (%)
9:06 to 13:30	13.3	264.8	11.0

Test ID: 3		Date:	6-Dec-18
Time	O_2 (%)	CO (ppm)	CO_2 (%)
9:08 to 18:10	13.5	399.3	10.8

Note:

[1] Sampling followed OSTC Method 3A (Oxygen and Carbon Dioxide)

Table 10D- Oxygen, Carbon Monoxide and Carbon Dioxide Results - Baseline Dec.
Kiln

Averaged Results		
O_2 (%)	CO (ppm)	CO_2 (%)
14.0	226.3	10.6

Test ID: 1		Date:	7-Dec-18
Time	O_2 (%)	CO (ppm)	CO_2 (%)
8:24 to 12:32	13.6	235.5	10.6

Test ID: 2		Date:	7-Dec-18
Time	O_2 (%)	CO (ppm)	CO_2 (%)
13:30 to 17:40	14.1	223.7	10.7

Test ID: 3		Date:	8-Dec-18
Time	O_2 (%)	CO (ppm)	CO_2 (%)
7:56 to 12:15	14.2	219.6	10.6

Note:
[1] Sampling followed OSTC Method 3A (Oxygen and Carbon Dioxide)

Table 11A: ECA Limit Comparisons - Baseline Oct.

Kiln

Parameter	Stack Testing Results [1]	ECA Limit [2]
Limits in Schedule B of the C of A (4614-826K9W)		
Particulate Matter	12.4 mg/Rm^3	50 mg/Rm^3
Cadmium	0.192 $\mu g/Rm^3$	7 $\mu g/Rm^3$
Lead	7.25 $\mu g/Rm^3$	60 $\mu g/Rm^3$
Mercury	2.46 $\mu g/Rm^3$	20 $\mu g/Rm^3$
Dioxins and Furans	16.6 pg/Rm^3	80 pg/Rm^3 ITEQ
HCl	8.78 mg/Rm^3	27 mg/Rm^3

Notes:

[1] - Concentration referenced to 25 ^{o} C, 101.3kPa, and 11% oxygen

[2] - Refer to Appendix A for the Amended Certificate of Approval

Hourly averages used for opacity

Table 11B: ECA Limit Comparisons - Alt. Fuels Oct.

Kiln

Parameter	Stack Testing Results [1]	ECA Limit [2]
Limits in Schedule B of the C of A (4614-826K9W)		
Particulate Matter	8.25 mg/Rm^3	50 mg/Rm^3
Cadmium	0.298 $\mu g/Rm^3$	7 $\mu g/Rm^3$
Lead	5.33 $\mu g/Rm^3$	60 $\mu g/Rm^3$
Mercury	1.54 $\mu g/Rm^3$	20 $\mu g/Rm^3$
Dioxins and Furans	19.6 pg/Rm^3 ITEQ	80 pg/Rm^3 ITEQ
HCl	6.07 mg/Rm^3	27 mg/Rm^3

Notes:

[1] - Concentration referenced to 25 ^{o} C, 101.3kPa, and 11% oxygen

[2] - Refer to Appendix A for the Amended Certificate of Approval

Hourly averages used for opacity

Table 11C: ECA Limit Comparisons - Alt. Fuels Dec.

Kiln

Parameter	Stack Testing Results [1]	ECA Limit [2]
Limits in Schedule B of the C of A (4614-826K9W)		
Particulate Matter	19.0 mg/Rm^3	50 mg/Rm^3
Cadmium	0.139 µg/Rm^3	7 µg/Rm^3
Lead	1.37 µg/Rm^3	60 µg/Rm^3
Mercury	1.43 µg/Rm^3	20 µg/Rm^3
Dioxins and Furans	8.70 pg/Rm^3 ITEQ	80 pg/Rm^3 ITEQ
HCl	7.61 mg/Rm^3	27 mg/Rm^3

Notes:

[1] - Concentration referenced to 25 ^{o} C, 101.3kPa, and 11% oxygen

[2] - Refer to Appendix A for the Amended Certificate of Approval

Hourly averages used for opacity

Table 11D: ECA Limit Comparisons - Baseline Dec.

Kiln

Parameter	Stack Testing Results [1]	ECA Limit [2]
Limits in Schedule B of the C of A (4614-826K9W)		
Particulate Matter	20.4 mg/Rm^3	50 mg/Rm^3
Cadmium	0.157 $\mu g/Rm^3$	7 $\mu g/Rm^3$
Lead	0.886 $\mu g/Rm^3$	60 $\mu g/Rm^3$
Mercury	0.857 $\mu g/Rm^3$	20 $\mu g/Rm^3$
Dioxins and Furans	9.52 pg/Rm^3	80 pg/Rm^3 ITEQ
HCl	2.99 mg/Rm^3	27 mg/Rm^3

Notes:

[1] - Concentration referenced to 25 ^{o} C, 101.3kPa, and 11% oxygen

[2] - Refer to Appendix A for the Amended Certificate of Approval

Hourly averages used for opacity

Table 12A: Summary of Operating Conditions - Pre-Baseline Oct.

Source and Test #	Sampling Date	Start Time	End Time	Clinker Rate (tonnes/day)	Hourly Combined Raw Feed (tonnes/hr)	Conventional Fuel Rate Kiln (tonnes/hr)	Conventional Fuel Rate Calciner (tonnes/hr)	Alt Fuel Rate to Calciner (tonnes/hr)	Oxygen at back of Kiln (%)	Oxygen at Calciner Down Comer (%)	Carbon Monoxide at back of Kiln (ppm)	Carbon Monoxide at Calciner Down Comer (ppm)	Temperature of gas leaving Kiln (°C)	Temperature of gas leaving Calciner (°C)	CEM NO_x (ppm)	CEM SO_2 (ppm)	CEM THC (ppm)	CEM Opacity (%)
Baseline																		
Test #1	30-Sep-18	12:06 PM	4:25 PM	5182	412	8.51	14.1	0	3.81	4.57	797	719	n/a	904	158	195	169	3.81
Test #2	1-Oct-18	8:57 AM	1:21 PM	5344	428	8.33	15.1	0	10.6	4.32	125	723	n/a	904	157	153	145	3.82
Test #3	2-Oct-18	8:08 AM	12:40 PM	5173	411	8.51	14.9	0	6.37	4.09	226	685	1150	904	164	164	164	3.83

Table 12B: Summary of Operating Conditions - Alt Fuels Oct.

Source and Test #	Sampling Date	Start Time	End Time	Clinker Rate (tonnes/day)	Hourly Combined Raw Feed (tonnes/hr)	Conventional Fuel Rate Kiln (tonnes/hr)	Conventional Fuel Rate Calciner (tonnes/hr)	Alt Fuel Rate to Calciner (tonnes/hr)	Oxygen at back of Kiln (%)	Oxygen at Calciner Down Comer (%)	Carbon Monoxide at back of Kiln (ppm)	Carbon Monoxide at Calciner Down Comer (ppm)	Temperature of gas leaving Kiln (°C)	Temperature of gas leaving Calciner (°C)	CEM NO_x (ppm)	CEM SO_2 (ppm)	CEM THC (ppm)	CEM Opacity (%)
Baseline																		
Test #1	10-Oct-18	11:53 AM	2:00 PM	5256.13	417.22	8.67	13.62	3.5	1.67	5.1	217.95	640.72	982.88	903.88	160.48	162.39	125.83	3.81
Test #2	12-Oct-18	8:45 AM	1:15 PM	5511.35	411.96	9.03	14.91	4.36	2.13	4.53	245.88	641.86	899.12	904.41	168.85	206.25	127.89	3.75
Test #3	12-Oct-18	1:57 PM	4:00 PM	5471.96	415.44	8.93	13.48	4.37	1.67	5.05	1018.77	601.62	907.39	903.98	165.35	264.68	175.4	3.91

Table 12C: Summary of Operating Conditions - Alt Fuels Dec.

Source and Test #	Sampling Date	Start Time	End Time	Clinker Rate (tonnes/day)	Hourly Combined Raw Feed (tonnes/hr)	Conventional Fuel Rate Kiln (tonnes/hr)	Conventional Fuel Rate Calciner (tonnes/hr)	Alt Fuel Rate to Calciner (tonnes/hr)	Oxygen at back of Kiln (%)	Oxygen at Calciner Down Comer (%)	Carbon Monoxide at back of Kiln (ppm)	Carbon Monoxide at Calciner Down Comer (ppm)	Temperature of gas leaving Kiln (°C)	Temperature of gas leaving Calciner (°C)	CEM NO_x (ppm)	CEM SO_2 (ppm)	CEM THC (ppm)	CEM Opacity (%)
Baseline																		
Test #1	4-Dec-18	1:02 PM	6:20 PM	5399.91	404.99	9.37	13.14	8.15	3.44	4.2	193.45	446.91	283.18	898.61	141.81	196.9	161.37	2.55
Test #2	5-Dec-18	9:05 AM	1:30 PM	5411.4	406.52	9.6	11.81	11.36	2.67	3.84	189.55	479.18	325.9	898.33	154.35	188.79	145.37	2.5
Test #3	6-Dec-18	9:06 AM	1:30 PM	5295.96	402.86	9.24	13.13	6.5	2.77	3.47	804.55	947.39	329.71	894.78	134.1	202.73	141.25	2.46

Table 12D: Summary of Operating Conditions - Post-Baseline Dec.

Source and Test #	Sampling Date	Start Time	End Time	Clinker Rate (tonnes/day)	Hourly Combined Raw Feed (tonnes/hr)	Conventional Fuel Rate Kiln (tonnes/hr)	Conventional Fuel Rate Calciner (tonnes/hr)	Alt Fuel Rate to Calciner (tonnes/hr)	Oxygen at back of Kiln (%)	Oxygen at Calciner Down Comer (%)	Carbon Monoxide at back of Kiln (ppm)	Carbon Monoxide at Calciner Down Comer (ppm)	Temperature of gas leaving Kiln (^oC)	Temperature of gas leaving Calciner (^oC)	CEM NO_x (ppm)	CEM SO_2 (ppm)	CEM THC (ppm)	CEM Opacity (%)
Baseline																		
Test #1	7-Dec-18	8:24 AM	12:32 PM	5422.86	409.04	9.86	19.11	0	4.5	4.14	127.96	470.7	315.07	897.77	161.92	109.39	118.23	2.48
Test #2	7-Dec-18	1:30 PM	5:40 PM	5422.04	411.31	10.11	18.18	0	5.37	4.68	181.94	469.23	316.56	898.25	169.87	137.18	163.1	2.44
Test #3	8-Dec-18	7:56 AM	12:20 PM	5421.26	392.27	9.87	17.9	0	3.11	4.32	350.88	468.01	304.51	898.28	163.47	144.9	na	2.43

APPENDIX A

Ontario

Ministry of the Environment
Ministère de l'Environnement

ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER 4614-826K9W
Issue Date: November 5, 2014

St. Marys Cement Inc. (Canada)
410 Waverly Rd R.R. 2
Bowmanville, Ontario
L1C 3K3

Site Location: 400 Waverly Road South
Clarington, Ontario

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

A time-limited Demonstration Project to gather site specific air quality data, where up to 30% of the conventional fuel, based on total energy input, is substituted with the following Alternative Fuels:

Alternative Fuel	Description	Maximum Input Rate (tonnes/hour)
Post-composting plastic polymers and woody residuals.	Shredded and dried plastic film and other plastic materials and woody materials removed from finished compost.	5.5
Plastic polymers, paper fibres and woody residuals derived from industrial and/or post consumer sources.	Shredded plastic and other materials removed from post consumer recycling or from industrial manufacturing process.	6.5

all in accordance with the application for an Approval (Air & Noise), signed by Martin Vroegh and all supporting information, including Emission Summary and Dispersion Modelling Report dated September 29, 2008, prepared by Pottinger Gaherty Environmental Consultants.

For the purpose of this environmental compliance approval, the following definitions apply:

1. "Approval" means this Environmental Compliance Approval, including the application and all supporting documentation;

2. "Alternative Fuel" means plastic polymers, paper fibres and woody residuals derived from industrial and/or post consumer sources, received as single streams, or blends of these material types, classified as Municipal Solid Waste under Ontario Regulation 347, written under the EPA, to be used as a substitute fuel source in the Cement Kiln;

3. "Ambient Air Quality Monitoring Program" means the ambient air quality monitoring program outlined in the report titled "Ambient Air Sampling Program", prepared for St. Marys Cement Inc, by Pottinger Gaherty Environmental Consultants Ltd., July 2008 and Addendum dated December 10, 2008, signed by Bridget Mills;

4. "Baseline Conditions" means operating conditions where only Conventional Fuel is used in the Cement Kiln;

5. "CEM System" means the continuous monitoring and recording systems used to measure the emissions from the Cement Kiln, as described in the Company's application, this Approval and in the supporting documentation referred to herein, to the extent approved by this Approval;

6. "Company" means St. Marys Cement Inc. (Canada) that is responsible for the construction or operation of the Facility and includes any successors and assigns;

7. "Cement Kiln" means the Cement Kiln, the Calciner and associated control equipment and continuous emissions monitoring systems, firing Conventional Fuel and Alternative Fuel, described in the Company's application, this Approval and in the supporting documentation referred to herein, to the extent approved by this Approval;

8. "Conventional Fuel" means solid fuels such as, petroleum coke and coal;

9. "Demonstration Project" means the demonstration project where up to 30 % of Conventional Fuel is substituted with Alternative Fuel in the Cement Kiln, as described in the Company's application, this Approval and in the supporting documentation referred to herein, to the extent approved by this Approval;

10. "District Manager" means the District Manager of the appropriate local district office of the Ministry, where the Facility is geographically located;

11. "EPA" means the Environmental Protection Act, R.S.O. 1990, c.E.19, as amended;

12. "Equipment" means the equipment and operations associated with the Demonstration Project, located on the property where the Cement Kiln is located, as described in the Company's application, this Approval and in the supporting documentation referred to herein, to the extent approved by this Approval;

13. "Facility" means the entire operation located on the property where the Equipment is located;

14. "Manager" means the Manager, Technology Standards Section, Standards Development Branch, who has been appointed under Section 5 of the EPA for the purposes of Section 11(1)2 of O.Reg. 419, or any other person who represents and carries out the duties of the Manager, Technology Standards Section, Standards Development Branch, as those duties relate to the conditions of this Approval;

15. "Manual" means a document or a set of documents that provide written instructions to staff of the Company;

16. "Ministry" means the ministry of the government of Ontario responsible for the EPA and includes all officials, employees or other persons acting on its behalf;

17. "Point of Impingement" means any point in the natural environment. The point of impingement for the purposes of verifying compliance with the EPA with respect to the Demonstration Project, shall be chosen as the point located outside the Company's property boundaries at which the highest concentration is expected to occur, when that concentration is calculated in accordance with a method accepted by the Director;

18. "Pre-test Information" means the information outlined in Section 1.1 of the Source Testing Code;

19. "Source Testing" means sampling and testing to measure emissions resulting from operating the Cement Kiln at a level of typical maximum production within the approved operating range of the Cement Kiln which satisfies paragraph 1 of subsection 11(1) of O. Reg. 419;

20. "Source Testing Code" means the Source Testing Code, Version 2, Report No. ARB-66-80, dated November 1980, prepared by the Ministry, as amended;

21. "Test Contaminants" means those contaminants set out in Schedules "B1" and "B2" attached to this Approval;

22. "Publication NPC-205" means the Ministry Publication NPC-205, "Sound level Limits for Stationary Sources in Class 1 & 2 Areas (Urban)", October, 1995 as amended; and

23. "Publication NPC-232" means the Ministry Publication NPC-232, "Sound Level Limits for Stationary Sources in Class 3 Areas (Rural)", October, 1995 as amended.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

OPERATION AND MAINTENANCE

1. (1) The Company shall ensure that the Facility is properly operated and maintained at all times while firing any amount of Alternative Fuel in the Cement Kiln during the Demonstration Project, so that operations of the Cement Kiln shall meet the operational limits set out in Schedule "A1". Alternative Fuel is to be stopped (following appropriate procedures) if one or more of Operational Limits is exceeded for more than one consecutive hour.

   (2) The Performance Objectives for emissions from the Cement Kiln Exhaust Stack are set out in Schedule "A2".

2. Unless otherwise approved in writing by the Director due to unforeseen delays in carrying out the Demonstration Project, the Company shall limit the combustion of Alternative Fuel in the Cement Kiln to the following:

   (1) Thirty (30) days for stack testing at the maximum fuel substitution (up to 30%);

   (2) Thirty (30) days for ramping up, stabilization, and ramping down.

3. The Company shall ensure that the Facility is properly operated and maintained at all times during the Demonstration Project. The Company shall:

   (1) prepare and update as necessary, prior to commencement of the Demonstration Project, a Design and Operations Manual specific to all aspects of the Facility, including the handling of Alternative Fuel and the use of Alternative Fuel in the Cement Kiln during the Demonstration Project, outlining the following:

      (a) operating and maintenance procedures in accordance with good engineering practices and as recommended by the equipment suppliers;

      (c) emergency procedures;

      (d) procedures for any record keeping activities relating to the operations of the Facility;

      (e) all appropriate measures to minimize odour, noise and dust emissions from all potential sources from the Facility;

   (2) implement the recommendations of the Design and Operations Manual during the Demonstration Project.

4. The Company shall, at all times, ensure that the noise emissions from the Facility comply with the limits set out in Ministry Publication NPC-205 or Ministry Publication NPC-232, as applicable, during the Demonstration Project.

RAW FEED AND FUELS - ANALYSIS AND MONITORING

5. The Company shall prepare and implement, prior to the firing of Alternative Fuel in the Cement Kiln, a Raw Feed and Fuels Analysis and Monitoring Program to record the properties and quantities of the Raw Feed and Fuels used in the Cement Kiln during the Demonstration Project. The Raw Materials and Fuels Analysis and Monitoring Program shall specify as a minimum:

   (1) sampling methodology and frequency and chemical analysis of raw feed, Conventional Fuel and Alternative Fuel directed to the Cement Kiln;

   (2) hourly feed rate of the raw feed, Conventional Fuel and Alternative Fuel in the Cement Kiln during the Demonstration Project.

MONITORING

CONTINUOUS EMISSIONS MONITORING

6. The Company shall ensure that the existing Continuous Emissions Monitoring Systems, are fully operational during the Demonstration Project, to continuously monitor the following parameters in the exhaust gas stream of the Cement Kiln Exhaust Stack:

   (a) Nitrogen Oxides;
   (b) Sulphur Dioxide;
   (c) Opacity;

   The Continuous Emissions Monitoring Systems for Nitrogen Oxides and Sulphur Dioxide shall comply with the requirements of O. Reg. 194/05, EPA – "Industry Emissions – Nitrogen Oxides and Sulphur Dioxide". The Continuous Emissions Monitoring System for Opacity shall comply with the requirements outlined in Schedule "D" attached to this Approval.

AMBIENT AIR QUALITY MONITORING

7. The Company shall conduct an Ambient Air Quality Monitoring Program during the Demonstration Project to determine the concentrations of the Test Contaminants listed in Schedule "B1", in accordance with the Ambient Air Quality Monitoring Program. Upwind and downwind sampling locations will be selected based on historical meteorological data and air dispersion modelling of the Cement Kiln stack. Ambient air sampling and monitoring will occur during both Baseline Conditions and with the use of Alternative Fuel in the Cement Kiln.

SOURCE TESTING

8. The Company shall conduct, a Source Testing Program, following the Source Testing Procedures listed in Schedule "C", during the Demonstration Project, to determine the rate of emission of the Test Contaminants listed in Schedule "B2" from the Cement Kiln Exhaust Stack. The Source Testing Program shall be designed to include both the Baseline Conditions and with the use of Alternative Fuel in the Cement Kiln.

REPORTING

9. The Company shall prepare and submit to the Director and District Manager, no later than six (6) months after the completion of the Demonstration Project, a Demonstration Project Summary Report. The Demonstration Project Summary Report shall include, as a minimum, but not limited to:

   (1) a summary of emission data and analysis obtained through the Source Testing Program, the Ambient Air Quality Monitoring Program and the Continuous Emissions Monitoring Program, conducted during the Demonstration Project, prepared in accordance with the requirements of the Reporting Procedures described in Schedule "C" attached to this Approval, as applicable;

   (2) a summary of all comments received by the Company during the Demonstration Project that pertain to the Demonstration Project from the public, the Ministry, or any other party.

10. The Company shall ensure that the above mentioned Demonstration Project Summary Report is made available and easily accessible for review by the public at the Facility and via an internet website, immediately after the document is submitted to the Ministry.

RECORD KEEPING REQUIREMENTS

11. The Company shall retain, for a minimum of five (5) years from the date of their creation and provide to the Ministry, upon request, in a timely manner, all reports, records and information required by this Approval and shall include but not be limited to:

   (1) time, date and duration of the Demonstration Project;

   (2) all records and reports produced from the Raw Feed and Fuels Analysis and Monitoring Program, the Source Testing Program, the Ambient Air Quality Monitoring Program and the Continuous Emissions Monitoring Program required under this Approval;

   (3) all records and reports produced as part of the assessments of emissions and impacts from the operation of the Cement Kiln, as a result of the utilization of Alternative Fuel for the Cement Kiln;

   (4) all records related to all environmental complaints made by the public during the Demonstration Project;

   (5) a copy of the Demonstration Project Summary Report required under Condition 8.

NOTIFICATION

12. The Company shall notify the District Manager, in writing, at least fifteen (15) business days prior to commencement of the Demonstration Project.

COMPLAINTS RESPONSE PROCEDURE

13. If at any time, the Company receives any environmental complaints from the public regarding the operation of the Facility during the Demonstration Project, the Company shall respond to these complaints according to the following procedure:

    (1) The District Manager shall be notified forthwith upon receipt of any complaint;

    (2) Each complaint shall be recorded and numbered, and shall include the following information, as a minimum:

        (a) nature of the complaint;
        (b) weather conditions and wind direction at the time of the complaint;
        (c) name and address of the complainant (if provided); and
        (d) time and date of the complaint;

    (3) Appropriate steps shall be taken forthwith to determine all possible causes of the complaint and to eliminate the cause of the complaint. A written reply shall be provided to the complainant, if known and if requested by the complainant, within 3 business days of receipt of the complaint by the Company.

SCHEDULE "A1"

OPERATIONAL LIMITS

Parameter	Limits	Comments
Quantity of Alternative Fuel	No more than 30% substitution (based on heating value).	Measured continuously.
Raw Material Feed Rate	>250 tonnes/hour	Measured continuously.
Temperature	>1000°C at a residence time of more than 6 seconds in the Kiln >850°C at a residence time of more than 3 seconds in the calciner	Measured by a continuous monitor Calculated as a rolling 1-hour arithmetic average measured by a continuous monitoring system that provides data at least once every 1 minute
Residual oxygen	>1% Residual oxygen at the backend of the kiln. >3% Residual oxygen at the calciner down comer duct.	Measured by a continuous monitor and calculated by volume on a dry basis in the undiluted gases leaving the Kiln. Calculated as a rolling 1-hour arithmetic average measured by a continuous monitoring system that provides data at least once every 1 minute
Pressure Control	Kiln must be operated under negative pressure at all times during the Demonstration Project.	Measured at the top of the preheater towers by continuous monitor.
Start-Up, Shut-down and Upset Operating conditions	No Alternative Fuel to be used.	-

<u>**SCHEDULE "A2"**</u>

PERFORMANCE OBJECTIVES

Parameter	**Emission Limit**	**Comments**
Particulate Matter (PM)	50 mg/Rm^3	calculated as the arithmetic average of three stack tests conducted in accordance with standard methods
Dioxins and Furans	80 pg/Rm^3 as ITEQ	calculated as the arithmetic average of three stack tests conducted in accordance with standard methods
Hydrochloric Acid (HCl)	27 mg/Rm^3	calculated as the arithmetic average of three stack tests conducted in accordance with standard methods
Cadmium	7 ug/Rm3	calculated as the arithmetic average of three stack tests conducted in accordance with standard methods
Lead	60 ug/Rm3	calculated as the arithmetic average of three stack tests conducted in accordance with standard methods
Mercury	20 ug/Rm3	calculated as the arithmetic average of three stack tests conducted in accordance with standard methods

Notes:

R - Reference flue gas conditions, defined as follows:

- Temperature 25 °C
- Pressure 101.3 kPa
- Oxygen content 11%
- Water content nil (dry conditions)

mg/Rm3 - milligrams per cubic metre of gas at Reference conditions.
ug/Rm3 - micrograms per cubic metre of gas at Reference conditions.
pg/Rm3 - picograms per cubic metre of gas at Reference conditions.
I-TEQ - a toxicity equivalent concentration calculated using the toxic equivalency factors (I-TEFs) derived for each dioxin and furan congener by comparing its toxicity to the toxicity of 2,3,7,8 tetrachloro dibenzo-p-dioxin, recommended by the North Atlantic Treaty Organizations's Committee on Challenges to Modern Society [NATO/CCMS] in 1989 and adopted by Canada in 1990.

SCHEDULE "B1"
TEST CONTAMINANTS
Ambient Air Quality Monitoring Program

Metals	Polycyclic Aromatic Hydrocarbons	Dioxins and Furans	Volatile Organic Compounds
Antimony (Sb)	1-Methyl naphthalene	2,3,7,8-Tetrachlorodibenzo-p-dioxin	acetone
Aluminum (Al)	1-Methyl phenanthrene	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	benzene
Arsenic (As)	2-Chloronaphthalene	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	chloromethane
Barium (Ba)	2-Methylanthracene	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	bromomethane
Beryllium (Be)	2-Methylnaphthalene	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	chloroethane
Boron (B)	3-Methylcholanthrene	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	1,1- dichloroethylene (vinyl chloride)
Cadmium (Cd)	7,12-Dimethylbenzo(a)anthracene	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	methylene chloride
Chromium (Cr)	9,10-Dimethylanthracene		1,1- dichloroethane
Cobalt (Co)	Acenaphthene	2,3,7,8-Tetrachlorodibenzofuran	trans - 1,2 -dichloroethylene
Copper (Cu)	Acenaphthylene	2,3,4,7,8-Pentachlorodibenzofuran	cis - 1,2 -dichloroethylene
Lead (Pb)	Anthracene	1,2,3,7,8-Pentachlorodibenzofuran	chloroform
Manganese (Mn)	Benzo(a)anthracene	1,2,3,4,7,8-Hexachlorodibenzofuran	1,2 -dichloroethane
Mercury (Hg)	Benzo(b)fluoranthene	1,2,3,6,7,8-Hexachlorodibenzofuran	2- butanone
Molybdenum (Mo)	Benzo(k)fluoranthene	1,2,3,7,8,9-Hexachlorodibenzofuran	1,1,1 –trichloroethane
Nickel (Ni)	Benzo(a)fluorene	2,3,4,6,7,8-Hexachlorodibenzofuran	carbon tetrachloride
Phosphorus (P)	Benzo(b)fluorene	1,2,3,4,6,7,8-Heptachlorodibenzofuran	1,1,2- trichloroethane
Potassium (K)	Benzo(g,h,i)perylene	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1,2- dichloropropane
Selenium (Se)	Benzo(a)pyrene	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	trichloroethylene
Silver (Ag)	Benzo(e)pyrene		bromodichloromethane
Strontium (Sr)	Chrysene		dibromochloromethane
Thalium (Tl)	Coronene		toluene
Tin (Sn)	Dibenzo(a,e)pyrene		tetrachloroethylene
Titanium (Ti)	Dibenzo(a,h)anthracene		chlorobenzene
Vanadium (V)	Fluoranthene		ethylbenzene
Zinc (Z)	Fluorene		m/p xylene
Calcium Oxide (CaO)	Indeno(1,2,3-cd)pyrene		o - xylene
Iron Oxide (FeO)	Naphthalene		styrene
	Perylene		bromoform
	Phenanthrene		1,1,1,2 -tetrachloroethane
	Pyrene		1,1,2,2 -tetrachloroethane
	Tetralin		cumene (isopropyl benzene)
	Dibenzo(a,c)anthracene + Picene (sum of 2)		1,2-dibromoethane (ethylene dibromide)

SCHEDULE "B2"

TEST CONTAMINANTS

Source Testing Program

Nitrogen Oxides
Sulphur Dioxide
Carbon Monoxide
Carbon Dioxide
Total Suspended Particulate Matter
PM 10
PM 2.5
Hydrogen Chloride
Ammonia
Calcium Oxide
Ferric Oxide

Metals		Volatile Organic Matter
Cd	Cadmium	acetone
Be	Beryllium	benzene
Pb	Lead	bromodichloromethane
Mo	Molybdenum	bromoform
Cr	Chromium	bromomethane
Ni	Nickel	butanone, 2 -
V	Vanadium	carbon tetrachloride
Al	Aluminum	chlorobenzene
Ti	Titanium	chloroethane
Mg	Magnesium	chloroform
B	Boron	chloromethane
Ba	Barium	cumene (isopropyl benzene)
P	Phosphorus	dibromochloromethane
K	Potassium	dichloroethane, 1,1 -
Hg	Mercury	dichloroethane, 1,2 -
As	Arsenic	dichloroethene, trans - 1,2 -
Zn	Zinc	dichloroethene, 1,1 – (vinyl chloride)
Sb	Antimony	dichloroethylene, cis - 1,2 -
Mn	Manganese	dichloropropane, 1,2 -
Co	Cobalt	ethylbenzene
Se	Selenium	ethylene dibromide (1,2-dibromoethane)
Cu	Copper	methylene chloride
Ag	Silver	styrene
Sn	Tin	tetrachloroethane, 1,1,1,2 -
Sr	Strontium	tetrachloroethane, 1,1,2,2 -
Tl	Thalium	tetrachloroethene
		toluene
		trichloroethane, 1,1,1 –
		trichloroethane, 1,1,2 -
		trichloroethene (trichloroethylene, 1,1,2 -)
		xylenes

Dioxins, Furans and Dioxin-like PCBs

2,3,7,8-Tetrachlorodibenzo-p-dioxin [2,3,7,8-TCDD]
1,2,3,7,8-Pentachlorodibenzo-p-dioxin [1,2,3,7,8-PeCDD]
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin [1,2,3,4,7,8-HxCDD]
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin [1,2,3,6,7,8-HxCDD]
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin [1,2,3,7,8,9-HxCDD]
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin [1,2,3,4,6,7,8-HpCDD]
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin [1,2,3,4,6,7,8,9-OCDD]
2,3,7,8-Tetrachlorodibenzofuran [2,3,7,8-TCDF]
2,3,4,7,8-Pentachlorodibenzofuran [2,3,4,7,8-PeCDF]
1,2,3,7,8-Pentachlorodibenzofuran [1,2,3,7,8-PeCDF]
1,2,3,4,7,8-Hexachlorodibenzofuran [1,2,3,4,7,8-HxCDF]
1,2,3,6,7,8-Hexachlorodibenzofuran [1,2,3,6,7,8-HxCDF]
1,2,3,7,8,9-Hexachlorodibenzofuran [1,2,3,7,8,9-HxCDF]
2,3,4,6,7,8-Hexachlorodibenzofuran [2,3,4,6,7,8-HxCDF]
1,2,3,4,6,7,8-Heptachlorodibenzofuran [1,2,3,4,6,7,8-HpCDF]
1,2,3,4,7,8,9-Heptachlorodibenzofuran [1,2,3,4,7,8,9-HpCDF]
1,2,3,4,6,7,8,9-Octachlorodibenzofuran [1,2,3,4,6,7,8,9-OCDF]

3,3',4,4'-Tetrachlorobiphenyl [3,3',4,4'-tetraCB (PCB 77)]
3,4,4',5- Tetrachlorobiphenyl [3,4,4',5-tetraCB (PCB 81)]
3,3',4,4',5- Pentachlorobiphenyl (PCB 126) [3,3',4,4',5-pentaCB (PCB 126)]
3,3',4,4',5,5'- Hexachlorobiphenyl [3,3',4,4',5,5'-hexaCB (PCB 169)]
2,3,3',4,4'- Pentachlorobiphenyl [2,3,3',4,4'-pentaCB (PCB 105)]
2,3,4,4',5- Pentachlorobiphenyl [2,3,4,4',5-pentaCB (PCB 114)]
2,3',4,4',5- Pentachlorobiphenyl [2,3',4,4',5-pentaCB (PCB 118)]
2',3,4,4',5- Pentachlorobiphenyl [2',3,4,4',5-pentaCB (PCB 123)]
2,3,3',4,4',5- Hexachlorobiphenyl [2,3,3',4,4',5-hexaCB (PCB 156)]
2,3,3',4,4',5'- Hexachlorobiphenyl [2,3,3',4,4',5'-hexaCB (PCB 157)]
2,3',4,4',5,5'- Hexachlorobiphenyl [2,3',4,4',5,5'-hexaCB (PCB 167)]
2,3,3',4,4',5,5'- Heptachlorobiphenyl [2,3,3',4,4',5,5'-heptaCB (PCB 189)]

Polycyclic Organic Matter:
Acenaphthylene
Acenaphthene
Anthracene
Benzo(a)anthracene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(a)fluorene
Benzo(b)fluorene
Benzo(ghi)perylene
Benzo(a)pyrene
Benzo(e)pyrene
2-Chloronaphthalene
Chrysene
Coronene
Dibenzo(a,c)anthracene
9,10-Dimethylanthracene
7,12-Dimethylbenzo(a)anthracene

Fluoranthene
Fluorene
Indeno(1,2,3-cd)pyrene
2-Methylanthracene
3-Methylcholanthrene
1-Methylnaphthalene
2-Methylnaphthalene
1-Methylphenanthrene
9-Methylphenanthrene
Naphthalene
Perylene
Phenanthrene
Picene
Pyrene
Tetralin
Triphenylene

Chlorinated Organics

total dichlorobenzenes
total trichlorobenzenes (1,3,5-; 1,2,3-; 1,2,4-)
total tetrachlorobenzenes (1,2,4,5-; 1,2,3,5-)
pentachlorobenzene
hexachlorobenzene
total dichlorophenols (2,3-; 2,4-; and 2,6-)
total trichlorophenols (2,3,4-; 2,4,5-; 2,4,6-; 3,4,5-)
total tetrachlorophenols (2,3,4,6-;2,3,5,6)
total pentachlorophenols

SCHEDULE "C"

MONITORING AND REPORTING PROCEDURES

A. SOURCE TESTING PROCEDURES

1. The Company shall submit, to the Manager a test protocol including the Pre-Test Information required by the Source Testing Code, at least thirty (30) days prior to the scheduled dates of the Source Testing Program.

2. The Company shall finalize the test protocol in consultation with the Manager.

3. The Company shall not commence the Source Testing until the Manager has accepted the test protocol.

4. The Company shall notify the District Manager and the Manager in writing of the location, date and time of any impending Source Testing required by this Approval, at least fifteen (15) days prior to the Source Testing.

5. The Director may not accept the results of the Source Testing Program if:
   (1) the Source Testing Code or the requirements of the Manager were not followed; or
   (2) the Company did not notify the District Manager and the Manager of the Source Testing; or
   (3) the Company failed to provide a complete report on the Source Testing.

B. REPORTING PROCEDURES

SOURCE TESTING PROGRAM

1. The Company shall submit a report on the Source Testing Program to the District Manager and the Manager not later than six (6) months after completing the Source Testing Program. The report shall be in the format described in the Source Testing Code, and shall also include, but not be limited to:

   (1) an executive summary;
   (2) records of operating conditions; including a summary of the results of the Raw Feed and Fuels Analysis and Monitoring Program as required by Condition 4 of this Approval;
   (3) all records produced by the continuous monitoring systems during the Demonstration Project;
   (4) assessment of compliance with the Cement Kiln Exhaust Stack Operating Limits for the parameters listed in Schedule "A1" attached to this Approval;
   (5) the results of source testing and air dispersion calculations in accordance with regulation 419/05, indicating the maximum concentration of the Test Contaminants emitted from the Cement Kiln Stack at the Point of Impingement and an assessment of compliance with Regulation 419/05 Schedule 3 standards; and
   (6) a description and explanation of any statistically significant changes in emissions from the Cement Kiln Exhaust Stack and Point of Impingement Concentrations of the Test Contaminants, if any, resulting from the use of Alternative Fuel, relative to the Baseline Conditions.

AMBIENT AIR MONITORING PROGRAM

2. The Company shall submit a report on the results of the Ambient Air Quality Monitoring Program, to the District Manager not later than six (6) months after completing the Demonstration Project . The report shall include, but not be limited to:

    (1) an executive summary;
    (2) records of operating conditions; including a summary of the results of the Raw Feed and Fuels Analysis and Monitoring Program;
    (3) sample dates, frequency and duration;
    (4) information on the exact location of samplers, including the analysis to site them. A map must be included, clearly showing where each monitoring station is located.
    (5) a description of the specifications of the monitors used in the Ambient Air Quality Monitoring Program;
    (6) a description of the specifications of the meteorological stations used to monitor and record meteorological conditions and analysis of wind direction
    (7) results of the Ambient Air Monitoring Program for the Test Contaminants listed in Schedule B1;
    (8) a description and explanation of any statistically significant changes in ambient air concentrations of the Test Contaminants, if any, resulting from the use of Alternative Fuel, relative to the Baseline Conditions.

SCHEDULE "D"

Continuous Monitoring System Requirements

PARAMETER: **Opacity**

INSTALLATION:
The Continuous Opacity Monitor shall be installed at an accessible location where the measurements are representative of the actual opacity of the gases leaving the *Cement Kiln Exhaust Stack* and shall meet the following design and installation specifications:

PARAMETERS	SPECIFICATION
1. Wavelength at Peak Spectral Response (nanometres, nm):	500 - 600
2. Wavelength at Mean Spectral Response (nm):	500 - 600
3. Detector Angle of View:	≤ 5 degrees
4. Angle of Projection:	≤ 5 degrees
5. Range (percent of opacity):	0 -100

PERFORMANCE:
The Continuous Opacity Monitor shall meet the following minimum performance specifications for the following parameters.

PARAMETERS	SPECIFICATION
1. Span Value (percent opacity):	80 percent
2. Calibration Error:	≤ 3 percent opacity
3. Attenuator Calibration:	≤ 2 percent opacity
4. Response Time (95 percent response to a step change):	≤ 10 seconds
5. Schedule for Zero and Calibration Checks:	daily minimum
6. Procedure for Zero and Calibration Checks:	all system components checked
7. Zero Calibration Drift (24-hours):	≤ 2 percent opacity
8. Span Calibration Drift (24-hours):	≤ 2 percent opacity
9. Conditioning Test Period:	≥ 168 hours without corrective maintenance
10. Operational Test Period:	≥ 168 hours without corrective maintenance

CALIBRATION:
The monitor shall be calibrated, to ensure that it meets the drift limits specified above, during the Demonstration Project. The results of all calibrations shall be recorded at the time of calibration.

DATA RECORDER:
The data recorder must be capable of registering continuously the measurement of the monitor with an accuracy of 0.5 percent of a full scale reading or better and with a time resolution of 30 seconds or better.

RELIABILITY:
The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 90 percent of the time during the Demonstration Project.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition No. 1 is included to outline the minimum performance requirements considered necessary to prevent an adverse effect resulting from the utilization of any Alternative Fuel for the Cement Kiln during the Demonstration Project.

2. Condition Nos. 2, 3 and 4 are included to require the Company to operate and maintain the Facility in accordance with the terms and conditions of this Approval.

3. Condition Nos. 5, 6, 7 and 8 are included to require the Company to gather accurate information so that the environmental impact and subsequent compliance with the EPA, Regulation 419/05 and this Approval can be verified.

4. Condition Nos. 9, 10, 11 and 12 are included to require the Company to retain records of information gathered during the Demonstration Project and to provide easy public access to information related to the Demonstration Project, so that the environmental impact and subsequent compliance with the EPA, the regulations and this Approval can be verified.

5. Condition No. 13 is included to require the Company to respond to any environmental complaints related to the Demonstration Project, according to procedures that include methods for preventing recurrence of similar incidents.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of
Part II.1 of the Environmental Protection Act
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 5th day of November, 2014

THIS APPROVAL WAS MAILED
ON November 7, 2014
H.A.
(Signed)

Rudolf Wan

Rudolf Wan, P.Eng.
Director
appointed for the purposes of Part II.1 of the *Environmental Protection Act*

QN/
c: District Manager, MOE York-Durham
Bridget Mills, P.Eng., BCX Environmental Consulting. ✓

APPENDIX B

Ministry of the Environment, Conservation and Parks
Technical Assessment and Standards Development Branch
40 St. Clair Avenue West
7th Floor
Toronto ON M4V 1M2
Phone: 416.327.5519
Fax: 416.327.2936

Ministère de l'Environnement, de la Protection de la nature et des Parcs
Direction des évaluations techniques et de l'élaboration des normes
40, avenue St. Clair Ouest
7e étage
Toronto (Ontario) M4V 1M2
Tél: 416 327.5519
Téléc: 416 327.2936

Via email: Kirk.Easto@rwdi.com

TSS File No.: CR:SA: 109690:18

2018/09/18

Kirk Easto
RWDI
600 Southgate Drive
Guelph, ON N1G 4P6

Dear Mr. Easto:

Subject: Pre-test plan review for source testing to be conducted at St. Mary's Cement Inc.

We received your pre-test plan (Project #1702401), dated August 30, 2018, prepared on behalf of St. Mary's Cement Inc. (SMC) and referring to source testing to be conducted at their facility in Bowmanville, Ontario.

Testing is a requirement under Environmental Compliance Approval No. 4614-826K9W issued November 5, 2014. The testing program will be conducted under baseline conditions and when firing alternative fuels.

Source to be Tested:

- Kiln Exhaust

Target Contaminants for the Source Testing Program:

- Total Suspended Particulate Matter (TSP)
- PM_{10} & $PM_{2.5}$
- Metals
- Semi-Volatile Organic Compounds (SVOC)
    - Dioxins, furans, dioxin-like PCBs
    - Polycyclic Organic Matter
    - Chlorinated Organics
- Hydrogen Chloride (HCl)
- Ammonia (NH_3)
- Volatile Organic Compounds (VOCs)
- Carbon Monoxide (CO)

***Reference Methods to be used*:**

Stack gas parameters	Ontario Source Testing Code (OSTC) Methods ON-1-ON-4
TSP	OSTC Method ON-5
PM_{10} & $PM_{2.5}$	US EPA Method 201A
Metals	US EPA Method 29
SVOC	Environment Canada EPS/1/RM/2
HCl & NH_3	US EPA Method 26
VOCs	US EPA SW846 Method 0030
CO	US EPA Method 10
O_2 and CO_2	US EPA Method 3A

***General Facility Description*:**

The fundamental process of cement manufacturing consists of combining materials bearing calcium oxide, silica, alumina, and iron oxide at high temperatures to produce cement clinker. The clinker is subsequently ground with finishing materials such as gypsum, limestone, clay and slag to produce cement.

The cement plant operates 12 months per year typically on 24 hours per day, seven days per week schedule with a maximum production capacity of 6,300 tonnes of clinker per day.

The proposed fuel supply during the demonstration product would be a blend of permitted fuel materials. This blend would consist of: “alternative fuel”- being 5.5 tonnes per hour of post-composting plastic polymers and woody residuals as well as 6.5 tonnes per hour of plastic polymers, paper fibres and woody residuals derived from industrial and/or post-consumer sources; as well as up to 4 tonnes per hour of “low carbon alternative fuels”.

Testing Strategy

The sampling location is considered ideal as per the OSTC.

Ferric oxide and calcium oxide will be calculated using the total calcium and iron measured in the method 29 train.

Nitrogen Oxides and Sulphur Dioxide will be monitored by the facility’s Continuous Emission Monitoring (CEM) system. The facility completes an annual Relative Accuracy Test Audit, which will be included in the final report.

***Operating Conditions during the Source Testing Program*:**

St. Mary’s will be operating as close to maximum production as possible. The normal production rate for the facility is 5,700 tonnes/day of clinker. The following will be monitored and included in the final report:

- Oxygen
- Opacity
- Nitrogen Oxides
- Sulphur Dioxide
- Hourly combined raw feed
- Hourly alternative fuels and conventional fuels firing rates in the kiln and calciner
- Hourly clinker production
- Concentration of the oxygen and carbon monoxide in the backend of the kiln and calciner down corner duct
- Temperature of the gases leaving the kiln
- Temperature of the gases leaving the calciner

The pre-test plan is approved as the proposed reference methodologies/sampling strategies are acceptable.

We have noted the sampling schedule to commence September 30, 2018. If changes to this schedule occur please notify both the MECP's York-Durham District Office and the Technology Standards Section.

Just a reminder that the source testing report is required to be submitted only in electronic format to the Technology Standards Section; and in electronic and hardcopy formats to the MECP's York-Durham District Office.

If you have any questions with regards to this assessment, I can be reached by phone at 416-325-3442 or by email at caitlyn.ruddy@ontario.ca

Sincerely,

Caitlyn Ruddy
Source Assessment Specialist
Technology Standards Section

cc: L. Urbina- St. Marys Cement (via email: luis.urbina@ycimentos.com)
K. Lendvay- York- Durham District Office (via email: Kim.Lendvay@ontario.ca)
C. Grant, G. Azocar- TASDB (via email)

File AQ-02 (St. Mary's Cement- Bowmanville)

Doc.Mgmt # 5AB090124

APPENDIX C

TPM and Metals Sampling Results
Baseline

Test :	Test #1			Test #2			Test #3			AVERAGE RESULTS	
Sample Volume (Rm^3) [1] :	3.77			3.84			3.87				
Stack Flow Rate (Rm^3/s) [1] :	272.6			282.0			279.5			278.0	
Parameter	**Lab Data**	**Concentration**	**Emission Rate**	**Lab Data**	**Concentration**	**Emission Rate**	**Lab Data**	**Concentration**	**Emission Rate**	**Concentration**	**Emission Rate**
Particulate	**(mg)**	**(mg/m^3)**	**(mg/s)**	**(mg)**	**(mg/m^3)**	**(mg/s)**	**(mg)**	**(mg/m^3)**	**(mg/s)**	**(mg/m^3)**	**(mg/s)**
Particulate in Acetone Rinse	25.2	-	-	10.1	-	-	5.6	-	-	-	-
Particulate on Filter	1.00	-	-	14.9	-	-	26.5	-	-	-	-
Total Particulate Matter	26.2	6.9	1890	25.0	6.5	1830	32.1	8.3	2320	7.3	2020
Metals	**(ug)**	**($\mu g/m^3$)**	**(mg/s)**	**(µg)**	**($\mu g/m^3$)**	**(mg/s)**	**(µg)**	**($\mu g/m^3$)**	**(mg/s)**	**($\mu g/m^3$)**	**(mg/s)**
Combined Train Aluminum (Al)	875	232	63.2	803	209	58.9	830	215	60.0	219	60.7
Combined Train Antimony (Sb)	< ND	< 0.80	< 0.2	< ND	< 1.95	< 0.550	< ND	< 1.94	< 0.542	< 1.56	< 0.436
Combined Train Arsenic (As)	1.76	0.47	0.127	< ND	< 0.52	< 0.147	< ND	< 0.52	< 0.145	< 0.501	< 0.139
Combined Train Barium (Ba)	27.3	7.24	1.970	26.3	7	1.930	19.8	5.12	1.430	6.40	1.78
Combined Train Beryllium (Be)	< ND	< 0.05	< 0.013	< ND	< 0.12	< 0.033	< ND	< 0.12	< 0.033	< 0.09	< 0.0262
Combined Train Boron (B)	69	18.30	4.99	< ND	< 19.50	< 5.50	< ND	< 19.40	< 5.420	< 19.1	< 5.30
Combined Train Cadmium (Cd)	0.35	0.093	0.025	0.47	0.12	0.035	0.48	0.12	0.035	0.113	0.032
Combined Train Calcium (Ca)	9870	2620	713	8520	2220	625	10600	2740	766	2520	702
Combined Train Chromium (Cr)	6.9	1.83	0.499	< ND	< 1.95	< 0.550	< ND	< 1.94	< 0.542	< 1.91	< 0.53
Combined Train Cobalt (Co)	7.24	1.92	0.5230	0.71	0.19	0.05210	< ND	< 0.12	< 0.03250	< 0.74	< 0.20
Combined Train Copper (Cu)	4.9	1.30	0.354	4.6	1.20	0.338	4.0	1.03	0.289	1.18	0.327
Combined Train Iron (Fe)	645	171	46.6	519	135	38.10	720	186	52.0	164	45.6
Combined Train Lead (Pb)	16.3	4.32	1.18	17.4	4.53	1.280	15.4	3.98	1.110	4.28	1.19
Combined Train Magnesium (Mg)	429	114	31.0	391	102	28.7	424	110	30.6	108	30.1
Combined Train Manganese (Mn)	27.6	7.32	1.99	24.8	6.45	1.820	18.4	4.76	1.330	6.18	1.7
Combined Train Molybdenum (Mo)	12.4	3.29	0.896	12.2	3.17	0.895	12.3	3.18	0.889	3.21	0.89
Combined Train Nickel (Ni)	8.8	2.33	0.636	6.9	1.80	0.506	5.7	1.47	0.412	1.87	0.518
Combined Train Phosphorus (P)	92	24.40	6.650	< ND	< 59.90	< 16.9	< ND	< 59.50	< 16.6	< 48	< 13.4
Combined Train Potassium (K)	1520	403	110	1460	380.0	107	1450	375	105	386	107
Combined Train Selenium (Se)	< ND	< 0.53	< 0.144	< ND	< 1.30	< 0.367	< ND	< 1.29	< 0.361	< 1.04	< 0.291
Combined Train Silver (Ag)	13.3	3.53	0.961	1.02	0.27	0.0749	< ND	< 0.16	< 0.043	< 1.32	< 0.36
Combined Train Strontium (Sr)	20.2	5.35	1.460	17.3	4.50	1.27	20.0	5.17	1.450	5.0	1.39
Combined Train Thallium (Tl)	0.50	0.13	0.036	< ND	< 0.16	< 0.044	< ND	< 0.16	< 0.043	< 0.148	< 0.04
Combined Train Tin (Sn)	114	30.20	8.240	125	32.50	9.170	108	27.90	7.810	30.2	8.41
Combined Train Titanium (Ti)	52.1	13.80	3.760	48.7	12.70	3.570	51.4	13.30	3.720	13.3	3.68
Combined Train Vanadium (V)	1.20	0.32	0.087	< ND	< 0.39	< 0.110	< ND	< 0.39	< 0.1080	< 0.365	< 0.102
Combined Train Zinc (Zn)	53	14.0	3.830	31	8.07	2.280	< ND	< 6.47	< 1.810	< 9.53	< 2.64
Mercury	**(µg)**	**($\mu g/m^3$)**	**(mg/s)**	**(µg)**	**($\mu g/m^3$)**	**(mg/s)**	**(µg)**	**($\mu g/m^3$)**	**(mg/s)**	**($\mu g/m^3$)**	**(mg/s)**
Total Mercury (Hg)	3.988	1.06	0.288	6.576	1.71	0.483	6.07	1.57	0.439	1.45	0.403

Notes :

[1] Sample volume and volumetric flow rate based on dry referenced conditions (101.3 kPa and 25 °C)

Concentration and Emission Rate has been reported to 3 significant figures.

'<' indicates that laboratory results were below the detection limit. The Reportable Detection Limit (RDL) was used to calculate the concentration and emission rate.

TPM and Metals Sampling
Kiln - Baseline

Facility: St. Mary's Cement				**Operator:** JG	
City: Bowmanville				**Entered by:** WC	
Source: Main Stack				**Checked by:** KNE	
Reference Method: US EPA Method 5/29					
DATA INPUTS	**Symbol**	**Units**	**Test #1** TPM/Metals	**Test #2** TPM/Metals	**Test #3** TPM/Metals
Date			30-Sep-18	1-Oct-18	2-Oct-18
Start Time			12:06 PM	8:57 AM	8:08 AM
End Time			4:25 PM	1:21 PM	12:40 PM
Round Stack, Diameter (Inside)	d_s	in	216	216	216
Standard Temperature	T_s	°F	77	77	77
Standard Pressure	P_s	in.Hg	29.92	29.92	29.92
Nozzle Diameter	D_n	in	0.211	0.211	0.211
Average Stack Temperature	T_s	°F	260	250	248
Average Meter Temperature	T_m	°F	73	69	71
Barometric Pressure	P_{bar}	" Hg	30.3	30.3	30.3
Stack Static Pressure	P_g	" H_2O	-0.4	-0.4	-0.4
Average Delta H	dH	" H_2O	1.66	1.66	1.66
Average Velocity Head (root mean square)	dP_{rms}	" H_2O	0.731	0.777	0.766
Pitot Coefficient	C_p	-	0.824	0.824	0.824
	Pitot ID :		RWDI 7'-1		
Gas Sample Volume	V_m	ft³	130.59	132.06	133.41
DGM Calibration Factor	Y	-	0.998	0.998	0.998
	DGM ID:		Console E		
Total Sampling Time	min	minutes	216	216	216
Stack Gas Oxygen Concentration	O_2	%	15.3	14.9	15.1
Stack Gas Carbon Dioxide Concentration	CO_2	%	11.4	11.9	12.2
Impinger Gain	W_w	g	209.3	226	235

TPM and Metals Sampling

Facility:	St. Mary's Cement	**Operator:**	JG
City:	Bowmanville	**Entered by:**	WC
Source:	Main Stack	**Checked by:**	KNE
Reference Method:	US EPA Method 5/29		

Emissions Calculations	**Symbol**	**Units**	**Test #1** TPM / Metals	**Test #2** TPM / Metals	**Test #3** TPM / Metals	**AVERAGE** TPM / Metals
Nozzle Area	A_n	ft²	2.43E-04	2.43E-04	2.43E-04	
Stack Area	A_s	ft²	254.47	254.47	254.47	
Average Stack Temperature	T_s	°R	720	710	708	713
Average DGM Temperature	T_m	°R	533	529	531	
Sample Volume at Reference Conditions	V_{mStd}	ft³	133.31	135.78	136.63	
	V_{mmstd}	**m³**	**3.77**	**3.84**	**3.87**	
Vol. of Water Vapour	V_{wStd}	ft³	10.05	10.86	11.29	
Water Fraction	B_{ws}		7.0%	7.4%	7.6%	7.3%
Molecular Weight, dry	M_d	g/mole	30.54	30.60	30.66	30.60
Molecular Weight, wet	M_w	g/mole	29.66	29.67	29.69	29.67
Absolute Stack Pressure	P_s	in. Hg	30.27	30.27	30.27	30.27
Stack Gas Velocity	U_s	ft/s	53.93	55.25	54.75	54.64
	U_{sm}	**m/s**	**16.44**	**16.84**	**16.69**	16.65
Actual Gas Flow Rate	Q_{act}	acf/min	823,395	843,498	835,857	834,250
Dry Gas Flow Rate (dry, ref)	Q_{ref}	dscf/min	577,690	597,680	592,326	589,232
	Q_{mref}	**m³/min**	**16354**	**16920**	**16769**	16,681
	Qmref (Actual O_2)	**m³/s**	**272.57**	**282.01**	**279.48**	278.02
Isokinetic Rate	I	%	101	100	101	101

TPM and Metals Sampling

Facility:	St. Mary's Cement	**Operator:**	JDG
City:	Bowmanville	**Entered by:**	WC
Source:	Main Stack	**Checked by:**	KNE
Reference Method:	US EPA Method 5/29	**Test Date**	30-Sep-18
Run:	Metals Test #1		

Pt.	**Time** (min)	**Velocity Press.** ("H_2O)	**Orifice Press.** ("H_2O)	**Meter Volume** (°F)	**Stack Temp** (°F)	**Probe Temp** (°F)	**Box Temp** (°F)	**Imp Temp** (°F)	**Meter Temp** (°F)	**Vac Pressure** ("Hg)	**Percentage Isokinetic** (%)	**Stack Velocity (ft/sec)**
Traverse 1- East												
Pre-Test Leak Check =		<0.02 at 12" Hg										
1	0	0.790	0.85	34.63	331	249	246	39	65	0	112	58.67
	2.5	0.790	0.83	36.10	300	247	245	43	65	0	93	57.51
	5	0.790	0.85	37.35	300	252	252	39	65	0	99	57.51
2	7.5	0.790	0.87	38.68	280	250	251	38	65	0	99	56.75
	10	0.790	0.88	40.03	280	250	251	38	66	0	100	56.75
	12.5	0.790	0.88	41.40	280	251	251	38	67	0	99	56.75
3	15	0.790	0.90	42.76	275	250	251	39	68	0	100	56.56
	17.5	0.790	0.90	44.14	275	250	250	39	68	0	100	56.56
	20	0.790	0.90	45.52	275	250	250	39	68	0	100	56.56
4	22.5	0.790	0.90	46.90	270	250	248	40	69	0	101	56.36
	25	0.790	0.90	48.29	271	250	250	40	69	0	97	56.40
	27.5	0.790	0.90	49.63	270	249	250	40	69	0	101	56.36
5	30	0.750	0.88	51.02	270	248	249	40	70	0	100	54.92
	32.5	0.750	0.88	52.37	270	250	249	40	70	0	102	54.92
	35	0.750	0.88	53.74	270	250	250	39	70	0	100	54.92
6	37.5	0.750	0.88	55.09	264	248	249	40	71	0	99	54.69
	40	0.700	0.83	56.43	264	248	249	40	71	0	101	52.84
	42.5	0.700	0.83	57.76	263	248	249	40	72	0	101	52.80
7	45	0.630	0.75	59.09	263	251	250	39	72	0	102	50.09
	47.5	0.630	0.75	60.36	262	248	251	39	72	0	101	50.06
	50	0.630	0.75	61.62	262	250	251	39	72	0	101	50.06
8	52.5	0.630	0.75	62.88	261	250	252	40	72	0	100	50.02
	55	0.630	0.75	64.13	260	249	249	40	72	0	101	49.99
	57.5	0.630	0.75	65.39	260	249	250	40	72	0	101	49.99
	60			66.65								
1	0	0.630	0.75	66.65	261	253	253	44	72	0	101	50.02
	2.5	0.630	0.75	67.91	260	253	254	41	72	0	99	49.99
	5	0.630	0.75	69.15	259	250	249	45	73	0	104	49.95
2	7.5	0.630	0.75	70.45	260	250	252	45	73	0	103	49.99
	10	0.630	0.75	71.74	258	250	249	45	74	0	108	49.92
	12.5	0.630	0.75	73.10	256	251	252	40	74	0	91	49.85
3	15	0.630	0.75	74.25	257	250	249	40	74	0	100	49.88
	17.5	0.700	0.85	75.51	257	250	249	40	74	0	100	52.58
	20	0.700	0.85	76.84	258	251	251	41	76	0	99	52.62
4	22.5	0.700	0.85	78.15	258	251	251	41	76	0	101	52.62
	25	0.700	0.85	79.49	258	240	257	41	76	0	102	52.62
	27.5	0.700	0.85	80.84	258	251	250	41	76	0	102	52.62
5	30	0.730	0.85	82.20	258	250	251	41	76	0	101	53.73
	32.5	0.730	0.85	83.57	257	250	248	41	76	0	105	53.70
	35	0.730	0.85	85.00	256	250	252	41	76	0	99	53.66
6	37.5	0.750	0.90	86.34	256	249	247	41	74	0	101	54.39
	40	0.750	0.90	87.73	256	250	250	41	74	0	101	54.39
	42.5	0.750	0.90	89.11	254	251	252	41	74	0	100	54.31
7	45	0.750	0.90	90.49	257	249	252	41	74	0	101	54.43
	47.5	0.750	0.90	91.88	256	250	247	41	74	0	100	54.39
	50	0.750	0.90	93.25	250	251	252	41	74	0	101	54.16
8	52.5	0.800	0.96	94.64	255	250	254	41	74	0	100	56.13
	55	0.800	0.96	96.06	255	248	248	41	74	0	102	56.13
	57.5	0.800	0.96	97.50	254	250	253	42	74	0	100	56.09
	60			98.92								
1	0	0.830	1.00	98.92	260	250	250	40	73	0	102	57.38
	2.5	0.830	1.00	100.38	260	249	245	43	73	0	99	57.38
	5	0.830	1.00	101.80	260	251	245	42	74	0	101	57.38
2	7.5	0.830	1.00	103.26	260	251	246	40	74	0	101	57.38
	10	0.830	1.00	104.71	260	252	244	43	74	0	100	57.38
	12.5	0.830	1.00	106.15	260	255	253	40	74	0	102	57.38
3	15	0.830	1.00	107.62	260	246	246	40	74	0	100	57.38
	17.5	0.830	1.00	109.06	260	255	250	40	74	0	101	57.38
	20	0.830	1.00	110.51	260	255	250	40	74	0	103	57.38
4	22.5	0.750	0.90	111.99	255	253	245	45	74	0	100	54.35
	25	0.750	0.90	113.37	256	251	245	45	74	0	100	54.39
	27.5	0.750	0.90	114.74	257	248	247	42	74	0	101	54.43
5	30	0.750	0.90	116.13	256	251	249	42	74	0	101	54.39
	32.5	0.750	0.90	117.51	256	247	249	42	74	0	94	54.39
	35	0.750	0.90	118.80	257	252	248	42	74	0	106	54.43
6	37.5	0.750	0.90	120.25	256	250	248	42	74	0	101	54.39
	40	0.700	0.85	121.64	254	246	249	42	74	0	101	52.47
	42.5	0.700	0.85	122.98	256	250	251	43	74	0	105	52.55
7	45	0.700	0.85	124.37	256	250	251	43	74	0	102	52.55
	47.5	0.650	0.80	125.72	255	252	251	43	74	0	100	50.60
	50	0.600	0.73	127.00	253	247	250	42	74	0	102	48.55
8	52.5	0.600	0.73	128.25	253	249	250	45	74	0	102	48.55
	55	0.600	0.73	129.50	251	254	251	43	74	0	102	48.48
	57.5	0.600	0.73	130.76	251	251	245	43	74	0	102	48.48
	60			132.02								
1	0	0.600	0.73	132.02	251	251	248	45	73	0	102	48.48
	2.5	0.600	0.73	133.27	251	250	248	45	73	0	96	48.48
	5	0.600	0.73	134.45	251	252	249	43	74	0	108	48.48
2	7.5	0.600	0.73	135.78	252	249	249	43	74	0	102	48.51
	10	0.600	0.73	137.04	251	252	249	43	74	0	101	48.48
	12.5	0.650	0.80	138.29	250	253	252	42	74	0	104	50.42
3	15	0.750	0.90	139.62	252	246	252	43	74	0	100	54.24
	17.5	0.750	0.91	140.99	253	251	251	42	74	0	101	54.28
	20	0.700	0.85	142.38	254	248	248	43	74	0	102	52.47
4	22.5	0.750	0.91	143.74	253	251	248	43	74	0	101	54.28
	25	0.750	0.91	145.13	254	245	251	42	74	0	101	54.31
	27.5	0.750	0.91	146.52	253	250	250	43	74	0	100	54.28
5	30	0.750	0.91	147.89	254	251	249	43	74	0	102	54.31
	32.5	0.800	0.97	149.29	254	246	245	46	74	0	102	56.09
	35	0.800	0.97	150.74	254	247	249	44	74	0	101	56.09
6	37.5	0.800	0.97	152.18	254	249	252	44	74	0	102	56.09
	40	0.800	0.97	153.63	253	252	251	44	74	0	104	56.06
	42.5	0.800	0.97	155.10	253	254	250	44	74	0	101	56.06
7	45	0.800	0.97	156.53	254	250	251	44	74	0	103	56.09
	47.5	0.800	0.97	157.99	254	250	250	45	74	0	101	56.09
	50	0.800	0.97	159.42	253	252	251	45	74	0	103	56.06
8	52.5	0.800	0.97	160.88	256	249	251	45	74	0	102	56.17
	55	0.800	0.97	162.32	256	251	250	45	74	0	102	56.17
	57.5	0.800	0.97	163.76	256	251	251	45	74	0	103	56.17
	60			165.22								
Post-test Leak Check =		<0.02 at 5" Hg										
	Average	0.731	0.870	130.59	260	250	250	42	73		101	53.93

TPM and Metals Sampling

Facility: St. Mary's Cement
City: Bowmanville
Source: Main Stack
Reference Method: US EPA Method 5/29
Run: Metals Test #2
Operator: JDG
Entered by: WC
Checked by: KNE
Test Date 1-Oct-18

Pt.	Time (min)	Velocity Press. ("H_2O)	Orifice Press. ("H_2O)	Meter Volume (^oF)	Stack Temp (^oF)	Probe Temp (^oF)	Box Temp (^oF)	Imp Temp (^oF)	Meter Temp (^oF)	Vac Pressure ("Hg)	Percentage Isokinetic (%)	Stack Velocity (ft/sec)
Traverse 1- South												
Pre-Test Leak Check =		<0.01 at 12" Hg										
1	0	0.800	0.93	67.10	255	249	250	45	52	0	94	56.13
	2.5	0.800	0.93	68.37	255	250	250	44	52	0	97	56.13
	5	0.800	0.93	69.68	255	249	250	44	52	0	99	56.13
2	7.5	0.800	0.93	71.02	248	251	251	44	53	0	100	55.85
	10	0.800	0.93	72.38	248	252	250	44	53	0	99	55.85
	12.5	0.800	0.93	73.73	249	249	250	45	54	0	100	55.89
3	15	0.800	0.93	75.09	248	245	250	48	54	0	100	55.85
	17.5	0.800	0.93	76.45	250	246	250	46	56	0	99	55.93
	20	0.750	0.88	77.80	249	249	248	46	56	0	100	54.11
4	22.5	0.750	0.88	79.12	251	250	250	46	57	0	97	54.19
	25	0.750	0.88	80.41	250	250	250	45	57	0	99	54.15
	27.5	0.750	0.88	81.73	250	252	250	44	57	0	97	54.15
5	30	0.750	0.88	83.02	250	247	251	43	58	0	100	54.15
	32.5	0.750	0.88	84.35	250	246	245	42	58	0	100	54.15
	35	0.750	0.88	85.68	250	247	244	42	58	0	101	54.15
6	37.5	0.750	0.91	87.02	250	246	248	41	58	0	101	54.15
	40	0.750	0.91	88.37	251	250	250	41	58	0	101	54.19
	42.5	0.650	0.79	89.71	250	251	251	41	58	0	102	50.41
7	45	0.650	0.79	90.97	251	250	251	42	58	0	101	50.45
	47.5	0.610	0.73	92.22	250	249	258	42	58	0	102	48.84
	50	0.610	0.73	93.45	250	250	256	42	58	0	99	48.84
8	52.5	0.610	0.73	94.64	250	250	255	42	59	0	105	48.84
	55	0.610	0.73	95.90	248	253	249	42	60	0	106	48.77
	57.5	0.610	0.73	97.18	250	251	250	40	60	0	106	48.84
	60			98.46								
1	0	0.610	0.73	98.46	247	251	250	40	64	0	99	48.73
	2.5	0.610	0.73	99.67	250	252	250	39	64	0	100	48.84
	5	0.610	0.73	100.88	250	251	249	38	64	0	100	48.84
2	7.5	0.610	0.75	102.10	250	248	251	38	64	0	103	48.84
	10	0.610	0.75	103.35	250	249	249	39	66	0	102	48.84
	12.5	0.610	0.75	104.59	250	250	250	39	66	0	103	48.84
3	15	0.610	0.75	105.85	250	248	250	39	66	0	102	48.84
	17.5	0.750	0.90	107.09	248	253	250	39	66	0	97	54.08
	20	0.750	0.91	108.40	250	250	251	39	66	0	101	54.15
4	22.5	0.750	0.91	109.77	250	251	250	40	66	0	99	54.15
	25	0.750	0.91	111.11	250	250	250	40	66	0	102	54.15
	27.5	0.750	0.91	112.49	250	250	250	40	66	0	102	54.15
5	30	0.750	0.91	113.87	250	250	250	40	68	0	102	54.15
	32.5	0.750	0.91	115.25	250	249	251	40	68	0	92	54.15
	35	0.750	0.91	116.50	250	250	250	40	68	0	100	54.15
6	37.5	0.750	0.91	117.85	250	250	250	40	68	0	100	54.15
	40	0.850	1.02	119.20	250	250	250	40	68	0	98	57.65
	42.5	0.850	1.02	120.62	249	250	252	40	68	0	99	57.61
7	45	0.850	1.02	122.05	249	250	250	40	69	0	93	57.61
	47.5	0.850	1.02	123.40	251	250	250	41	69	0	102	57.69
	50	0.850	1.02	124.87	251	250	251	41	69	0	105	57.69
8	52.5	0.850	1.02	126.39	250	251	251	41	70	0	91	57.65
	55	0.850	1.02	127.71	250	251	249	41	70	0	98	57.65
	57.5	0.850	1.02	129.13	250	251	250	41	70	0	98	57.65
	60			130.55								
1	0	0.870	1.10	130.55	251	251	249	42	70	0	100	58.37
	2.5	0.870	1.10	132.02	251	247	251	42	71	0	101	58.37
	5	0.870	1.10	133.50	251	248	251	42	72	0	99	58.37
2	7.5	0.870	1.10	134.95	251	246	249	42	72	0	99	58.37
	10	0.870	1.10	136.40	250	251	249	42	73	0	90	58.32
	12.5	0.870	1.10	137.73	251	252	250	42	75	0	103	58.37
3	15	0.850	1.00	139.26	250	252	251	43	75	0	96	57.65
	17.5	0.850	1.00	140.66	250	250	249	43	75	0	97	57.65
	20	0.850	1.00	142.08	250	249	249	43	75	0	96	57.65
4	22.5	0.850	1.00	143.49	250	251	249	43	75	0	96	57.65
	25	0.850	1.00	144.89	254	251	251	43	75	0	97	57.81
	27.5	0.800	0.96	146.31	250	251	250	43	77	0	99	55.93
5	30	0.800	0.96	147.72	250	250	249	43	77	0	98	55.93
	32.5	0.800	0.96	149.12	252	248	251	44	77	0	101	56.01
	35	0.800	0.96	150.56	249	251	251	44	77	0	101	55.89
6	37.5	0.800	0.96	152.00	250	249	249	44	77	0	91	55.93
	40	0.800	0.96	153.30	249	250	251	44	77	0	99	55.89
	42.5	0.750	0.92	154.71	250	251	251	44	77	0	99	54.15
7	45	0.750	0.92	156.07	250	251	251	44	77	0	101	54.15
	47.5	0.750	0.92	157.46	252	251	251	44	77	0	101	54.23
	50	0.750	0.92	158.85	250	250	249	47	77	0	101	54.15
8	52.5	0.750	0.95	160.25	250	250	251	47	77	0	100	54.15
	55	0.750	0.95	161.63	250	250	251	47	77	0	100	54.15
	57.5	0.750	0.95	163.01	250	246	249	46	77	0	101	54.15
	60			164.41								
1	0	0.800	0.98	164.41	247	252	250	250	76	0	100	55.81
	2.5	0.800	0.98	165.83	249	248	249	249	77	0	100	55.89
	5	0.800	0.98	167.25	251	251	250	250	77	0	99	55.97
2	7.5	0.750	0.92	168.66	249	248	251	251	77	0	100	54.11
	10	0.800	0.98	170.04	249	249	249	249	77	0	102	55.89
	12.5	0.800	0.98	171.50	249	249	249	249	77	0	99	55.89
3	15	0.800	0.98	172.91	249	251	251	251	77	0	100	55.89
	17.5	0.800	0.98	174.33	249	251	250	250	77	0	103	55.89
	20	0.820	1.01	175.80	250	251	250	250	78	0	102	56.62
4	22.5	0.820	1.01	177.27	249	249	250	250	78	0	95	56.58
	25	0.820	1.01	178.64	250	252	250	250	78	0	98	56.62
	27.5	0.820	1.01	180.05	250	251	250	250	78	0	100	56.62
5	30	0.820	1.01	181.50	251	251	250	250	78	0	99	56.66
	32.5	0.850	1.04	182.93	249	250	250	250	78	0	99	57.61
	35	0.850	1.04	184.38	250	250	250	250	78	0	100	57.65
6	37.5	0.850	1.04	185.85	250	251	250	250	78	0	102	57.65
	40	0.850	1.00	187.35	250	251	250	250	78	0	101	57.65
	42.5	0.850	1.00	188.83	250	251	250	251	78	0	100	57.65
7	45	0.850	1.00	190.30	250	249	250	248	78	0	101	57.65
	47.5	0.850	1.00	191.79	250	249	251	248	78	0	100	57.65
	50	0.850	1.00	193.26	250	250	248	251	78	0	101	57.65
8	52.5	0.850	1.00	194.75	250	250	248	251	78	0	101	57.65
	55	0.850	1.00	196.23	248	250	251	251	78	0	99	57.57
	57.5	0.850	1.00	197.69	250	250	251	251	78	0	100	57.65
	60			199.16								
Post-test Leak Check =		<0.01 at 12" Hg										
	Average	0.777	0.938	132.06	250	250	250	94	69		100	55.25

TPM and Metals Sampling

Facility: St. Mary's Cement
City: Bowmanville
Source: Main Stack
Reference Method: US EPA Method 5/29
Run: Metals Test #3
Operator: JDG
Entered by: WC
Checked by: KNE
Test Date 2-Oct-18

Pt.	Time (min)	Velocity Press. ("H_2O)	Orifice Press. ("H_2O)	Meter Volume (^oF)	Stack Temp (^oF)	Probe Temp (^oF)	Box Temp (^oF)	Imp Temp (^oF)	Meter Temp (^oF)	Vac Pressure ("Hg)	Percentage Isokinetic (%)	Stack Velocity (ft/sec)
Traverse 1- South												
Pre-Test Leak Check =		<0.02 at 12" Hg										
1	0	0.790	0.97	345.89	245	252	251	43	55	0	121	55.36
	2.5	0.760	0.93	347.53	245	251	250	40	56	0	119	54.30
	5	0.840	1.00	349.12	245	252	250	40	56	0	100	57.09
2	7.5	0.820	0.98	350.52	246	249	250	40	56	0	102	56.44
	10	0.800	0.98	351.93	246	249	251	40	58	0	99	55.75
	12.5	0.800	0.98	353.29	252	250	251	40	58	0	101	55.99
3	15	0.750	0.91	354.67	246	250	250	41	58	0	100	53.98
	17.5	0.740	0.91	356.00	247	248	250	41	58	0	102	53.66
	20	0.750	0.92	357.35	247	250	250	40	61	0	101	54.02
4	22.5	0.750	0.92	358.70	247	258	250	40	61	0	101	54.02
	25	0.750	0.92	360.05	248	250	248	40	61	0	103	54.06
	27.5	0.750	0.92	361.43	249	250	248	41	61	0	104	54.09
5	30	0.710	0.87	362.82	249	249	249	41	61	0	102	52.63
	32.5	0.710	0.87	364.14	248	250	250	41	61	0	103	52.60
	35	0.710	0.87	365.48	248	250	250	40	61	0	105	52.60
6	37.5	0.710	0.87	366.84	248	250	248	40	61	0	100	52.60
	40	0.660	0.80	368.14	248	250	250	40	61	0	100	50.71
	42.5	0.660	0.80	369.40	247	250	250	40	61	0	105	50.67
7	45	0.660	0.80	370.72	248	247	250	40	61	0	102	50.71
	47.5	0.650	0.80	372.00	246	252	248	40	61	0	100	50.25
	50	0.600	0.74	373.25	245	250	250	41	61	0	103	48.25
8	52.5	0.600	0.74	374.48	245	250	250	41	61	0	102	48.25
	55	0.610	0.75	375.70	246	250	250	41	61	0	104	48.68
	57.5	0.610	0.75	376.95	245	246	250	41	61	0	103	48.65
	60			378.20								
1	0	0.840	0.87	378.20	243	251	245	43	61	0	100	57.01
	2.5	0.840	0.87	379.62	245	250	251	37	65	0	111	57.09
	5	0.840	0.87	381.20	245	249	250	37	65	0	104	57.09
2	7.5	0.800	0.87	382.68	246	249	251	37	65	0	85	55.75
	10	0.800	0.80	383.87	246	245	251	39	65	0	99	55.75
	12.5	0.840	0.80	385.25	247	251	250	39	68	0	98	57.17
3	15	0.840	0.87	386.66	245	250	250	39	68	0	103	57.09
	17.5	0.840	0.87	388.14	249	251	251	39	68	0	98	57.25
	20	0.800	0.87	389.54	247	247	250	39	68	0	101	55.79
4	22.5	0.800	0.87	390.96	246	249	250	40	68	0	101	55.75
	25	0.780	0.92	392.38	249	250	251	41	68	0	101	55.17
	27.5	0.780	0.92	393.78	250	250	251	41	68	0	99	55.20
5	30	0.720	0.93	395.15	249	252	250	40	68	0	102	53.00
	32.5	0.720	0.94	396.50	246	251	251	40	68	0	102	52.89
	35	0.720	0.94	397.86	246	251	250	40	73	0	100	52.89
6	37.5	0.720	0.94	399.20	246	252	250	40	73	0	100	52.89
	40	0.700	0.94	400.54	246	250	250	40	73	0	101	52.15
	42.5	0.700	0.94	401.87	247	249	249	41	73	0	101	52.19
7	45	0.700	0.94	403.21	247	249	250	41	73	0	101	52.19
	47.5	0.650	0.94	404.54	247	250	250	41	73	0	104	50.29
	50	0.620	0.94	405.87	247	249	250	41	73	0	100	49.11
8	52.5	0.620	0.94	407.12	248	249	251	41	73	0	101	49.15
	55	0.620	0.94	408.37	248	250	250	41	73	0	101	49.15
	57.5	0.620	0.94	409.62	249	250	250	41	73	0	101	49.18
	60			410.88			.					
1	0	0.860	1.10	410.88	247	251	245	42	73	0	102	57.84
	2.5	0.860	1.10	412.38	247	250	247	40	73	0	102	57.84
	5	0.860	1.10	413.88	247	249	250	40	73	0	95	57.84
2	7.5	0.860	1.10	415.27	247	249	250	40	73	0	94	57.84
	10	0.860	1.10	416.65	248	249	250	40	73	0	99	57.88
	12.5	0.860	1.10	418.10	248	251	251	41	73	0	90	57.88
3	15	0.820	1.00	419.42	249	250	250	41	73	0	109	56.56
	17.5	0.820	1.00	420.97	248	251	250	41	75	0	100	56.52
	20	0.840	1.00	422.40	247	247	250	41	75	0	101	57.17
4	22.5	0.840	1.00	423.87	246	249	251	41	76	0	79	57.13
	25	0.840	1.00	425.02	245	250	250	42	76	0	115	57.09
	27.5	0.840	1.00	426.70	245	250	250	42	76	0	103	57.09
5	30	0.800	0.98	428.20	249	252	245	44	76	0	99	55.87
	32.5	0.800	0.98	429.61	247	251	250	44	77	0	100	55.79
	35	0.800	0.98	431.03	247	251	250	44	77	0	101	55.79
6	37.5	0.720	0.88	432.47	247	252	250	44	79	0	99	52.93
	40	0.720	0.88	433.81	247	250	249	45	79	0	99	52.93
	42.5	0.720	0.88	435.15	249	249	250	45	79	0	98	53.00
7	45	0.660	0.81	436.48	248	249	250	45	79	0	101	50.71
	47.5	0.660	0.81	437.79	248	251	251	45	79	0	103	50.71
	50	0.660	0.81	439.12	249	252	251	45	79	0	100	50.75
8	52.5	0.660	0.81	440.42	249	249	250	45	79	0	101	50.75
	55	0.700	0.86	441.73	250	250	251	45	79	0	100	52.30
	57.5	0.700	0.86	443.07	247	250	250	45	79	0	102	52.19
	60			444.44								
1	0	0.700	0.86	444.44	249	250	250	50	78	0	100	52.26
	2.5	0.700	0.86	445.77	250	249	249	50	78	0	101	52.30
	5	0.700	0.86	447.12	249	249	249	50	78	0	99	52.26
2	7.5	0.700	0.86	448.44	249	250	250	48	80	0	99	52.26
	10	0.700	0.86	449.77	249	249	250	49	80	0	102	52.26
	12.5	0.700	0.86	451.13	249	249	250	49	80	0	101	52.26
3	15	0.780	0.96	452.48	251	249	250	49	80	0	98	55.24
	17.5	0.790	0.97	453.86	252	250	250	49	80	0	100	55.64
	20	0.790	0.97	455.28	252	250	250	49	80	0	102	55.64
4	22.5	0.840	1.00	456.72	252	250	251	49	80	0	99	57.37
	25	0.840	1.00	458.17	253	251	251	49	80	0	102	57.41
	27.5	0.840	1.00	459.66	252	250	250	49	80	0	99	57.37
5	30	0.840	1.00	461.11	253	248	250	50	80	0	103	57.41
	32.5	0.880	1.10	462.61	252	249	250	50	80	0	102	58.72
	35	0.880	1.10	464.13	253	251	250	50	80	0	100	58.76
6	37.5	0.900	1.10	465.63	252	246	250	50	80	0	101	59.38
	40	0.900	1.10	467.16	253	253	250	50	80	0	102	59.42
	42.5	0.900	1.10	468.70	253	252	250	50	80	0	101	59.42
7	45	0.900	1.10	470.22	253	246	250	50	80	0	114	59.42
	47.5	0.890	1.10	471.95	252	245	250	52	80	0	87	59.05
	50	0.890	1.10	473.26	253	250	250	52	80	0	101	59.09
8	52.5	0.860	1.10	474.78	252	251	250	52	80	0	101	58.05
	55	0.900	1.10	476.27	253	250	250	52	80	0	100	59.42
	57.5	0.900	1.10	477.78	252	250	250	52	80	0	100	59.38
	60			479.30								
Post-test Leak Check =		<0.01 at 12" Hg										
	Average	0.766	0.937	133.41	248	250	250	43	71		101	54.75

TPM and Metals Sampling Results

Alt Fuels: October

Test :	Test #1			Test #2			Test #3			AVERAGE RESULTS	
Sample Volume (Rm^3) [1] :	4.07			3.77			3.71				
Stack Flow Rate (Rm^3/s) [1] :	282.1			278.3			268.9			276.4	
Parameter	**Lab Data**	**Concentration**	**Emission Rate**	**Lab Data**	**Concentration**	**Emission Rate**	**Lab Data**	**Concentration**	**Emission Rate**	**Concentration**	**Emission Rate**
Particulate	**(mg)**	**(mg/m^3)**	**(mg/s)**	**(mg)**	**(mg/m^3)**	**(mg/s)**	**(mg)**	**(mg/m^3)**	**(mg/s)**	**(mg/m^3)**	**(mg/s)**
Particulate in Acetone Rinse	6.3	-	-	11.9	-	-	6.3	-	-	-	-
Particulate on Filter	9.50	-	-	9.60	-	-	10.1	-	-	-	-
Total Particulate Matter	15.8	3.9	1090	21.5	5.7	1590	16.4	4.4	1190	4.7	1290
Metals	**(µg)**	**(µg/m^3)**	**(mg/s)**	**(µg)**	**(µg/m^3)**	**(mg/s)**	**(µg)**	**(µg/m^3)**	**(mg/s)**	**(µg/m^3)**	**(mg/s)**
Aluminum (Al)	510	125	35.3	633	168	46.7	439	118	31.8	137	37.9
Antimony (Sb)	< 7.5	< 2	< 0.519	< 7.5	< 1.99	< 0.554	< 7.5	< 2.02	< 0.543	< 1.95	< 0.539
Arsenic (As)	< 2.0	< 0.49	< 0.138	< 2.0	< 0.53	< 0.148	< 2.0	< 0.539	< 0.145	< 0.520	< 0.144
Barium (Ba)	25.8	6.33	1.79	23.0	6.10	1.70	20.9	5.63	1.51	6.02	1.67
Beryllium (Be)	< 0.45	< 0.11	< 0.031	< 0.45	< 0.12	< 0.033	< 0.45	< 0.121	< 0.033	< 0.117	< 0.0323
Boron (B)	< 75	< 18.4	< 5.19	< 75	< 19.9	< 5.54	< 75	< 20.2	< 5.43	< 19.5	< 5.39
Cadmium (Cd)	< 0.45	< 0.11	< 0.0312	1.03	0.27	0.076	< 0.45	< 0.121	< 0.033	< 0.17	< 0.0466
Calcium (Ca)	5900	1450	408	6930	1840	512	4510	1220	327	1500	416
Chromium (Cr)	< 7.5	< 1.84	< 0.519	< 7.5	< 1.99	< 0.554	< 7.5	< 2.02	< 0.543	< 1.95	< 0.54
Cobalt (Co)	< 0.45	< 0.110	< 0.031	0.51	0.135	0.038	< 0.45	< 0.121	< 0.033	< 0.12	< 0.0338
Copper (Cu)	< 3.8	< 0.93	< 0.263	4.7	1.25	0.347	< 3.8	< 1.02	< 0.275	< 1.07	< 0.295
Iron (Fe)	398	97.7	27.6	419	111	30.9	285	76.8	20.7	95.2	26.40
Lead (Pb)	9.0	2.21	0.623	15.7	4.17	1.16	10.2	2.75	0.739	3.04	0.840
Magnesium (Mg)	243	59.6	16.8	279	74.0	20.6	174	46.9	12.6	60.2	16.7
Manganese (Mn)	11.6	2.85	0.803	10.7	2.84	0.790	7.9	2.13	0.572	2.60	0.722
Molybdenum (Mo)	11.7	2.87	0.810	11.5	3.05	0.849	11.7	3.15	0.848	3.02	0.836
Nickel (Ni)	8.5	2.09	0.588	10.7	2.84	0.790	4.8	1.29	0.348	2.07	0.575
Phosphorus (P)	< 230	< 56.4	< 15.9	< 230	< 61.0	< 17.0	< 230	< 62.0	< 16.7	< 59.8	< 16.5
Potassium (K)	979	240	67.8	1140	302	84.2	1280	345	92.7	296	81.6
Selenium (Se)	< 5.0	< 1.23	< 0.346	< 5.0	< 1.33	< 0.369	< 5.0	< 1.35	< 0.362	< 1.30	< 0.359
Silver (Ag)	< 0.60	< 0.15	< 0.042	< 0.60	< 0.16	< 0.044	< 0.60	< 0.162	< 0.044	< 0.156	< 0.043
Strontium (Sr)	13.0	3.19	0.900	14.6	3.87	1.08	10.4	2.80	0.754	3.29	0.910
Thallium (Tl)	< 0.60	< 0.15	< 0.042	< 0.60	< 0.16	< 0.044	< 0.60	< 0.162	< 0.044	< 0.16	< 0.0431
Tin (Sn)	104	25.5	7.20	101	26.8	7.46	101	27.2	7.32	26.5	7.32
Titanium (Ti)	36.4	8.93	2.52	53.2	14.1	3.93	32.5	8.76	2.35	10.6	2.93
Vanadium (V)	< 1.5	< 0.37	< 0.104	< 1.5	< 0.40	< 0.111	< 1.5	< 0.40	< 0.109	< 0.39	< 0.108
Zinc (Zn)	< 25	< 6.14	< 1.73	54	14.3	3.99	< 25	< 6.74	< 1.81	< 9.07	< 2.51
Mercury	**(µg)**	**(µg/m^3)**	**(mg/s)**	**(µg)**	**(µg/m^3)**	**(mg/s)**	**(µg)**	**(µg/m^3)**	**(mg/s)**	**(µg/m^3)**	**(mg/s)**
Filterable Hg	0.045	-	-	0.021	-	-	0.038	-	-	-	-
Non-Filterable Hg	2.96	-	-	3.50	-	-	< 3.59	-	-	-	-
Total Hg	3.00	0.74	0.208	3.52	0.94	0.260	< 3.63	< 0.978	< 0.263	< 0.884	< 0.244

Notes :

[1] Sample volume and volumetric flow rate based on dry referenced conditions (101.3 kPa and 25 °C)

'<' indicates that laboratory results were below the detection limit. The Method Detection Limit (RDL) was used to calculate the concentration and emission rate.

Concentration and Emission Rate has been reported to 3 significant figures.

TPM and Metals Sampling
Kiln Stack Alt Fuels

Facility: St. Mary's Cement				**Operator:** JDF	
City: Bowmanville				**Entered by:** TFL	
Source: Main Stack Alt Fuels				**Checked by:** JDF	
Reference Method: US EPA Method 5/29					
DATA INPUTS	**Symbol**	**Units**	**Test #1** TPM/Metals	**Test #2** TPM/Metals	**Test #3** TPM/Metals
Date			10-Oct-18	12-Oct-18	12-Oct-18
Start Time			11:53 AM	8:48 AM	1:57 PM
End Time			6:20:00 PM*	1:13 PM	6:18 PM
Round Stack, Diameter (Inside)	d_s	in	216	216	216
Standard Temperature	T_s	°F	77	77	77
Standard Pressure	P_s	in.Hg	29.92	29.92	29.92
Nozzle Diameter	D_n	in	0.211	0.211	0.211
Average Stack Temperature	T_s	°F	269	259	260
Average Meter Temperature	T_m	°F	83	63	69
Barometric Pressure	P_{bar}	" Hg	29.4	29.3	29.3
Stack Static Pressure	P_g	" H_2O	-0.7	-0.7	-0.7
Average Delta H	dH	" H_2O	1.66	1.66	1.66
Average Velocity Head (root mean square)	dP_{rms}	" H_2O	0.804	0.762	0.732
Pitot Coefficient	C_p	-	0.840	0.840	0.840
	Pitot ID :		RWDI 7' #3		
Gas Sample Volume	V_m	ft³	148.45	132.42	131.82
DGM Calibration Factor	Y	-	0.998	0.998	0.998
	DGM ID:		Console E		
Total Sampling Time	min	minutes	216	216	216
Stack Gas Oxygen Concentration	O_2	%	15.6	15.4	15.0
Stack Gas Carbon Dioxide Concentration	CO_2	%	11.4	10.3	10.6
Impinger Gain	W_w	g	259.9	227	283.9

TPM and Metals Sampling

Facility:	St. Mary's Cement	**Operator:**	JDF
City:	Bowmanville	**Entered by:**	TFL
Source:	Main Stack Alt Fuels	**Checked by:**	JDF
Reference Method:	US EPA Method 5/29		

DO

Emissions Calculations	**Symbol**	**Units**	**Test #1** TPM / Metals	**Test #2** TPM / Metals	**Test #3** TPM / Metals	**AVERAGE** TPM / Metals
Nozzle Area	A_n	ft²	2.43E-04	2.43E-04	2.43E-04	
Stack Area	A_s	ft²	254.47	254.47	254.47	
Average Stack Temperature	T_s	°R	729	719	720	723
Average DGM Temperature	T_m	°R	543	523	529	
Sample Volume at Reference Conditions	V_{mStd}	ft³	143.97	133.19	131.16	
	V_{mmstd}	**m³**	**4.07**	**3.77**	**3.71**	
Vol. of Water Vapour	V_{wStd}	ft³	12.48	10.91	13.63	
Water Fraction	B_{ws}		8.0%	7.6%	9.4%	8.3%
Molecular Weight, dry	M_d	g/mole	30.55	30.37	30.40	30.44
Molecular Weight, wet	M_w	g/mole	29.55	29.43	29.23	29.41
Absolute Stack Pressure	P_s	in. Hg	29.35	29.25	29.25	29.28
Stack Gas Velocity	U_s	ft/s	58.86	57.22	56.55	57.54
	U_{sm}	**m/s**	**17.94**	**17.44**	**17.24**	17.54
Actual Gas Flow Rate	Q_{act}	acf/min	898,749	873,574	863,445	878,589
Dry Gas Flow Rate (dry, ref)	Q_{ref}	dscf/min	597,847	589,754	569,995	585,865
	Q_{mref}	**m³/min**	**16925**	**16696**	**16137**	16,586
	Qmref (Actual O_2)	**m³/s**	**282.08**	**278.27**	**268.94**	276.43
Isokinetic Rate	I	%	100	99	101	100

TPM and Metals Sampling

Facility: St. Mary's Cement
City: Bowmanville
Source: Main Stack Alt Fuels
Reference Method: US EPA Method 5/29
Run: Metals Test #1
Operator: JDF
Entered by: TFL
Checked by:
10-Oct-18

Pt.	Time (min)	Velocity Press. ("H_2O)	Orifice Press. ("H_2O)	Meter Volume (^oF)	Stack Temp (^oF)	Probe Temp (^oF)	Box Temp (^oF)	Imp Temp (^oF)	Meter Temp (^oF)	Meter Inlet (^oF)	Meter Outlet (^oF)	Vac Pressure ("Hg)	Percentage Isokinetic (%)	Stack Velocity (ft/sec)
Traverse 1- East														
Pre-Test Leak Check =		<0.02 at 12" Hg												
1	0	0.85	1.12	958.13	290	259	251	75	80	80	80	0	108	61.47
	2.5	0.85	1.10	959.73	287	248	250	72	79	79	79	0	105	61.35
	5	0.80	1.00	961.29	287	250	289	69	80	80	79	0	97	59.51
2	7.5	0.80	1.00	962.68	285	251	251	68	81	82	80	0	100	59.43
	10	0.80	1.00	964.12	284	250	289	65	81	81	80	0	100	59.39
	12.5	0.80	1.00	965.56	283	250	250	65	82	84	80	0	99	59.35
3	15	0.80	1.00	967.00	281	250	249	65	82	84	80	0	99	59.27
	17.5	0.80	1.00	968.43	281	250	250	67	84	86	82	0	99	59.27
	20	0.80	1.00	969.87	281	249	251	68	84	86	82	0	98	59.27
4	22.5	0.80	1.00	971.30	280	251	249	68	85	87	82	0	99	59.23
	25	0.80	1.00	972.74	280	249	249	67	85	87	82	0	97	59.23
	27.5	0.80	1.00	974.16	278	250	249	66	85	87	82	0	99	59.15
5	30	0.80	1.00	975.60	279	251	250	65	86	89	82	0	97	59.19
	32.5	0.80	1.00	977.02	277	250	250	65	86	89	82	0	96	59.11
	35	0.75	0.95	978.42	275	250	249	65	86	89	82	0	97	57.16
6	37.5	0.75	0.95	979.80	276	250	249	65	86	89	82	0	104	57.20
	40	0.75	0.95	981.27	275	250	251	65	86	89	82	0	100	57.16
	42.5	0.75	0.95	982.69	275	250	249	65	87	90	83	0	101	57.16
7	45	0.75	0.95	984.12	272	250	250	65	87	90	83	0	98	57.04
	47.5	0.75	0.85	985.51	272	249	250	64	88	92	84	0	95	57.04
	50	0.65	0.85	986.87	272	250	250	64	90	95	84	0	101	53.10
8	52.5	0.65	0.85	988.22	272	250	250	64	90	95	84	0	101	53.10
	55	0.65	0.85	989.57	271	250	250	64	91	97	85	0	102	53.07
	57.5	0.65	0.85	990.93	271	251	250	64	91	96	86	0	99	53.07
	60			992.26										
1	0	0.65	0.85	992.26	271	281	250	67	93	99	86	0	102	53.07
	2.5	0.65	0.85	993.63	271	281	250	65	93	99	86	0	102	53.07
	5	0.65	0.83	995.00	270	249	250	63	92	98	86	0	100	53.03
2	7.5	0.65	0.83	996.34	269	251	250	63	93	98	87	0	99	52.99
	10	0.65	0.83	997.67	269	251	250	63	93	98	87	0	99	52.99
	12.5	0.65	0.83	999.00	269	250	251	63	94	98	89	0	100	52.99
3	15	0.65	0.83	1000.35	270	250	250	64	93	97	89	0	97	53.03
	17.5	0.70	0.95	1001.65	268	249	250	64	93	97	89	0	103	54.96
	20	0.70	0.93	1003.09	269	250	250	63	94	98	89	0	99	54.99
4	22.5	0.70	0.93	1004.47	269	250	250	63	94	98	89	0	103	54.99
	25	0.75	1.00	1005.91	268	250	250	63	94	98	89	0	101	56.89
	27.5	0.75	1.00	1007.37	269	250	250	63	94	98	89	0	102	56.93
5	30	0.75	1.00	1008.84	267	250	251	63	95	98	91	0	100	56.85
	32.5	0.75	1.00	1010.29	266	250	251	63	96	100	91	0	100	56.81
	35	0.80	1.10	1011.75	267	250	250	63	97	101	92	0	103	58.71
6	37.5	0.80	1.10	1013.30	268	250	249	63	97	101	92	0	103	58.75
	40	0.75	1.00	1014.85	266	250	249	63	97	101	92	0	102	56.81
	42.5	0.75	1.00	1016.33	265	250	250	64	97	101	92	0	100	56.77
7	45	0.75	1.00	1017.78	266	250	250	64	97	101	92	0	100	56.81
	47.5	0.75	1.00	1019.23	265	250	249	65	97	101	93	0	101	56.77
	50	0.80	1.10	1020.70	265	250	250	64	98	102	93	0	100	58.63
8	52.5	0.85	1.15	1022.21	266	250	250	64	98	102	93	0	98	60.48
	55	0.85	1.15	1023.73	266	249	250	66	98	102	93	0	98	60.48
	57.5	0.85	1.15	1025.25	261	250	250	66	98	103	93	0	99	60.27
	60			1026.79										
1	0	0.90	1.25	26.80	265	248	246	60	95	96	94	0	104	62.19
	2.5	0.92	1.20	28.45	262	250	251	60	97	98	95	0	99	62.74
	5	0.95	1.30	30.05	262	250	253	60	97	98	95	0	100	63.76
2	7.5	0.95	1.30	31.70	262	249	251	60	97	98	95	0	98	63.76
	10	0.92	1.30	33.31	262	251	259	60	97	99	95	0	100	62.74
	12.5	0.92	1.20	34.93	261	250	249	60	97	99	95	0	99	62.70
3	15	0.90	1.20	36.53	262	251	249	60	97	99	95	0	100	62.06
	17.5	0.90	1.20	38.13	262	250	250	58	98	101	95	0	99	62.06
	20	0.92	1.30	39.72	262	251	251	58	98	101	95	0	99	62.74
4	22.5	0.86	1.20	41.32	260	251	252	58	98	101	95	0	98	60.58
	25	0.86	1.20	42.86	261	251	252	58	98	101	95	0	99	60.62
	27.5	0.86	1.20	44.42	262	250	253	58	98	101	95	0	102	60.66
5	30	0.82	1.10	46.01	261	251	251	58	99	101	96	0	100	59.19
	32.5	0.92	1.20	47.54	267	225	226	55	63	63	62	0	100	62.96
	35	0.92	1.20	56.92	265	225	227	55	63	63	62	0	99	62.87
6	37.5	0.90	1.20	58.42	265	226	230	51	64	65	63	0	102	62.19
	40	0.90	1.20	59.95	265	233	228	51	64	65	63	0	101	62.19
	42.5	0.90	1.20	61.46	265	230	234	51	64	65	63	0	101	62.19
7	45	0.90	1.20	62.98	266	235	239	51	64	65	63	0	101	62.23
	47.5	0.89	1.20	64.50	264	243	227	48	66	67	64	0	100	61.80
	50	0.85	1.10	66.00	266	241	226	46	66	67	64	0	101	60.48
8	52.5	0.85	1.10	67.48	267	250	226	46	66	67	64	0	99	60.52
	55	0.85	1.10	68.93	266	251	229	46	66	67	64	0	101	60.48
	57.5	0.85	1.10	70.41	266	246	229	46	66	67	64	0	100	60.48
	60			71.88										
1	0	0.85	1.10	71.88	266	236	229	46	66	67	64	0	102	60.48
	2.5	0.90	1.20	73.37	267	238	227	44	68	71	65	0	100	62.27
	5	0.92	1.20	74.88	267	240	227	44	68	71	65	0	100	62.96
2	7.5	0.93	1.20	76.41	266	239	227	43	69	72	66	0	99	63.26
	10	0.93	1.20	77.94	268	247	228	43	69	72	66	0	99	63.35
	12.5	0.93	1.10	79.47	267	237	227	43	69	72	66	0	99	63.30
3	15	0.86	1.10	80.99	266	240	229	43	69	72	66	0	101	60.83
	17.5	0.86	1.10	82.48	266	245	229	43	71	73	68	0	97	60.83
	20	0.86	1.10	83.92	265	244	229	43	71	73	68	0	98	60.79
4	22.5	0.86	1.10	85.38	266	247	230	43	71	73	68	0	98	60.83
	25	0.89	1.10	86.84	267	248	231	43	71	73	68	0	100	61.93
	27.5	0.89	1.10	88.35	266	251	234	43	71	73	68	0	73	61.88
5	30	0.80	1.00	89.46	265	240	235	43	71	73	68	0	127	58.63
	32.5	0.80	1.00	91.28	266	244	226	44	72	74	69	0	100	58.67
	35	0.80	1.00	92.72	266	252	236	44	72	74	69	0	99	58.67
6	37.5	0.74	1.00	94.14	266	248	234	44	72	74	69	0	99	56.43
	40	0.74	0.90	95.51	264	250	237	44	72	74	69	0	98	56.35
	42.5	0.74	0.90	96.87	265	251	239	44	72	74	69	0	98	56.39
7	45	0.73	0.90	98.22	266	251	239	44	72	74	70	0	99	56.05
	47.5	0.76	0.97	99.58	266	246	237	44	72	74	70	0	102	57.19
	50	0.76	0.97	101.01	265	241	239	44	72	74	70	0	101	57.15
8	52.5	0.76	0.97	102.42	263	234	236	44	72	74	70	0	101	57.07
	55	0.72	0.92	103.84	262	237	233	44	72	74	70	0	101	55.51
	57.5	0.72	0.92	105.22	264	228	228	44	72	74	70	0	100	55.58
	60			106.59										
Post-test Leak Check =		<0.01 at 5" Hg												
	Average	0.804	1.047	148.45	269	248	244	57	83				100	58.86

TPM and Metals Sampling

Facility: St. Mary's Cement
City: Bowmanville
Source: Main Stack Alt Fuels
Reference Method: US EPA Method 5/29
Run: Metals Test #2

Operator: JDF
Entered by: TFL
Checked by: JDF
Date: 12-Oct-18

Pt.	Time (min)	Velocity Press. ("H_2O)	Orifice Press. ("H_2O)	Meter Volume (^oF)	Stack Temp (^oF)	Probe Temp (^oF)	Box Temp (^oF)	Imp Temp (^oF)	Meter Temp (^oF)	Meter Inlet (^oF)	Meter Outlet (^oF)	Vac Pressure ("Hg)	Percentage Isokinetic (%)	Stack Velocity (ft/sec)
Traverse 1- South														
Pre-Test Leak Check =	<0.01 at 12" Hg													
1	0	0.85	1.10	108.19	258	250	250	35	54	55	53	0	103	60.37
	2.5	0.85	1.05	109.68	260	250	246	37	56	58	54	0	97	60.45
	5	0.85	1.05	111.09	258	250	249	36	58	61	55	0	96	60.37
2	7.5	0.85	1.05	112.50	258	250	251	36	58	61	55	0	96	60.37
	10	0.85	1.05	113.90	259	253	247	36	58	60	55	0	99	60.41
	12.5	0.85	1.05	115.34	261	248	248	36	58	61	55	0	97	60.49
3	15	0.85	1.05	116.75	260	250	249	36	59	62	55	0	98	60.45
	17.5	0.80	1.00	118.18	259	252	249	35	59	62	55	0	97	58.60
	20	0.80	1.00	119.56	260	252	251	35	59	62	55	0	100	58.64
4	22.5	0.80	1.00	120.98	260	249	252	35	59	62	56	0	99	58.64
	25	0.80	1.00	122.38	262	251	253	36	59	62	56	0	104	58.73
	27.5	0.85	1.00	123.86	262	250	249	35	60	63	56	0	95	60.53
5	30	0.80	1.00	125.25	260	250	252	34	60	63	56	0	99	58.64
	32.5	0.80	1.00	126.65	259	249	247	33	60	63	57	0	97	58.60
	35	0.80	1.00	128.03	261	249	251	35	61	63	58	0	101	58.69
6	37.5	0.70	0.90	129.47	262	249	254	35	61	63	58	0	99	54.93
	40	0.70	0.90	130.79	262	251	252	36	61	63	58	0	101	54.93
	42.5	0.70	0.90	132.13	260	249	247	35	61	63	58	0	101	54.86
7	45	0.65	0.85	133.48	260	250	247	35	61	63	58	0	101	52.86
	47.5	0.65	0.85	134.78	259	250	250	35	61	63	58	0	101	52.83
	50	0.65	0.85	136.08	260	250	251	35	61	63	58	0	104	52.86
8	52.5	0.65	0.85	137.42	259	251	249	35	61	63	58	0	96	52.83
	55	0.65	0.85	138.65	259	248	248	35	61	63	58	0	101	52.83
	57.5	0.65	0.85	139.95	259	250	251	35	61	63	58	0	100	52.83
	60			141.23										
1	0	0.70	0.90	141.24	259	251	249	37	59	60	58	0	99	54.82
	2.5	0.70	0.90	142.55	259	251	249	37	60	61	58	0	100	54.82
	5	0.70	0.90	143.88	258	250	249	35	60	61	59	0	101	54.78
2	7.5	0.70	0.90	145.23	258	250	250	35	60	61	59	0	99	54.78
	10	0.70	0.88	146.55	258	250	247	36	61	62	59	0	95	54.78
	12.5	0.70	0.88	147.82	258	250	247	36	61	62	59	0	101	54.78
3	15	0.85	1.05	149.17	257	249	243	36	61	62	59	0	97	60.32
	17.5	0.85	1.05	150.60	258	246	247	36	62	64	59	0	96	60.37
	20	0.70	0.89	152.02	259	249	240	37	62	64	59	0	102	54.82
4	22.5	0.70	0.87	153.38	259	250	240	37	62	64	59	0	99	54.82
	25	0.80	1.00	154.70	259	250	238	37	61	63	59	0	99	58.60
	27.5	0.80	1.00	156.11	257	252	242	38	62	63	60	0	98	58.52
5	30	0.80	1.00	157.51	258	249	244	37	62	63	60	0	99	58.56
	32.5	0.80	1.00	158.93	257	245	245	37	62	63	60	0	99	58.52
	35	0.80	1.00	160.35	258	250	250	37	62	64	60	0	98	58.56
6	37.5	0.80	1.00	161.75	258	250	250	37	62	64	60	0	99	58.56
	40	0.80	1.00	163.16	258	250	250	37	62	64	60	0	101	58.56
	42.5	0.80	1.00	164.60	256	250	250	37	62	64	60	0	98	58.48
7	45	0.80	1.00	166.00	256	250	250	37	62	64	60	0	98	58.48
	47.5	0.80	1.00	167.40	256	250	250	37	62	64	60	0	98	58.48
	50	0.80	1.00	168.81	260	249	246	37	62	64	60	0	99	58.64
8	52.5	0.80	1.00	170.22	259	248	244	37	64	65	62	0	98	58.60
	55	0.80	1.00	171.63	260	250	251	37	64	65	62	0	98	58.64
	57.5	0.80	1.00	173.03	259	250	251	38	63	65	61	0	97	58.60
	60			174.42										
1	0	0.87	1.12	174.44	259	250	240	41	62	62	62	0	98	61.11
	2.5	0.87	1.12	175.90	259	250	245	40	62	63	60	0	99	61.11
	5	0.87	1.12	177.38	261	240	232	37	62	63	60	0	100	61.20
2	7.5	0.87	1.12	178.87	261	240	238	37	62	63	60	0	100	61.20
	10	0.80	1.00	180.35	260	252	244	37	63	65	61	0	98	58.64
	12.5	0.80	1.00	181.75	260	251	245	37	63	65	61	0	98	58.64
3	15	0.80	1.00	183.15	260	250	244	38	63	65	61	0	98	58.64
	17.5	0.80	1.00	184.55	261	245	251	38	63	65	61	0	95	58.69
	20	0.80	1.00	185.91	260	250	242	37	63	65	61	0	102	58.64
4	22.5	0.80	1.00	187.37	260	250	242	38	63	65	61	0	97	58.64
	25	0.80	1.00	188.76	260	250	242	38	63	65	61	0	98	58.64
	27.5	0.80	1.00	190.16	260	250	243	38	63	65	61	0	99	58.64
5	30	0.75	0.95	191.57	260	248	246	36	63	65	61	0	100	56.78
	32.5	0.75	0.95	192.95	260	251	250	36	63	65	61	0	97	56.78
	35	0.75	0.95	194.30	260	249	258	38	64	66	61	0	98	56.78
6	37.5	0.75	0.95	195.66	259	246	240	38	65	67	62	0	99	56.74
	40	0.65	0.95	197.03	261	246	239	38	65	67	62	0	101	52.90
	42.5	0.70	0.89	198.34	260	246	237	38	65	67	63	0	97	54.86
7	45	0.70	0.89	199.65	260	250	241	38	65	67	63	0	100	54.86
	47.5	0.60	0.77	200.99	260	250	241	38	65	67	63	0	100	50.79
	50	0.60	0.77	202.24	257	241	236	39	65	67	63	0	101	50.68
8	52.5	0.60	0.75	203.50	257	246	231	40	65	67	63	0	100	50.68
	55	0.60	0.75	204.75	257	241	231	40	65	67	63	0	100	50.68
	57.5	0.60	0.75	206.00	259	241	246	40	65	67	63	0	99	50.75
	60			207.23										
1	0	0.60	0.79	207.23	260	241	246	40	65	67	63	0	98	50.79
	2.5	0.60	0.79	208.45	260	241	241	40	65	67	63	0	99	50.79
	5	0.60	0.79	209.68	256	240	230	39	67	68	65	0	98	50.65
2	7.5	0.75	0.79	210.91	259	240	230	39	67	68	65	0	99	56.74
	10	0.75	0.79	212.29	257	230	235	39	67	68	65	0	98	56.66
	12.5	0.75	0.79	213.66	257	230	239	39	67	68	65	0	99	56.66
3	15	0.75	0.90	215.04	258	235	239	40	68	70	66	0	99	56.70
	17.5	0.75	0.90	216.42	258	235	240	40	68	70	66	0	99	56.70
	20	0.75	0.90	217.80	256	235	240	40	69	71	66	0	98	56.62
4	22.5	0.75	0.90	219.17	258	236	241	42	69	71	66	0	98	56.70
	25	0.80	0.85	220.55	259	230	242	42	69	71	66	0	101	58.60
	27.5	0.80	0.85	222.01	256	231	242	42	70	73	67	0	102	58.48
5	30	0.80	0.85	223.49	256	235	242	42	70	73	67	0	100	58.48
	32.5	0.80	0.85	224.95	255	235	238	42	70	73	67	0	100	58.44
	35	0.82	0.90	226.40	257	239	237	41	70	72	67	0	100	59.25
6	37.5	0.82	0.90	227.87	260	238	237	41	70	72	67	0	90	59.37
	40	0.82	0.90	229.19	260	238	241	41	70	72	67	0	104	59.37
	42.5	0.82	0.90	230.72	260	238	241	41	70	72	67	0	96	59.37
7	45	0.82	0.90	232.13	256	241	247	42	69	71	67	0	97	59.21
	47.5	0.80	0.90	233.56	256	249	247	42	69	71	67	0	99	58.48
	50	0.80	0.90	234.99	258	251	249	42	69	71	67	0	97	58.56
8	52.5	0.80	0.90	236.40	256	228	236	42	69	71	67	0	98	58.48
	55	0.80	0.90	237.82	257	236	237	42	69	71	67	0	98	58.52
	57.5	0.80	0.90	239.24	257	236	237	42	69	71	67	0	97	58.52
	60			240.64										
Post-test Leak Check =	<0.01 at 12" Hg													
	Average	0.762	0.937	132.42	259	246	245	38	63				99	57.22

TPM and Metals Sampling

Facility: St. Mary's Cement
City: Bowmanville
Source: Main Stack Alt Fuels
Reference Method: US EPA Method 5/29
Run: Metals Test #3

Operator: JDG
Entered by: TFL
Checked by:
12-Oct-18

Pt.	Time (min)	Velocity Press. ("H_2O)	Orifice Press. ("H_2O)	Meter Volume (^oF)	Stack Temp (^oF)	Probe Temp (^oF)	Box Temp (^oF)	Imp Temp (^oF)	Meter Temp (^oF)	Meter Inlet (^oF)	Meter Outlet (^oF)	Vac Pressure ("Hg)	Percentage Isokinetic (%)	Stack Velocity (ft/sec)
Traverse 1- South														
Pre-Test Leak Check =	<0.02 at 12" Hg													
1	0	0.85	1.10	241.00	255	232	225	43	62	62	62	0	101	60.44
	2.5	0.85	1.10	242.47	255	240	237	42	62	62	62	0	98	60.44
	5	0.85	1.10	243.89	255	251	237	42	63	63	62	0	100	60.44
2	7.5	0.85	1.10	245.34	255	251	235	42	63	63	62	0	97	60.44
	10	0.85	1.10	246.75	258	252	238	42	64	65	62	0	102	60.57
	12.5	0.85	1.10	248.23	258	252	241	41	64	65	62	0	103	60.57
3	15	0.80	1.00	249.72	257	251	232	41	65	66	63	0	100	58.72
	17.5	0.80	1.00	251.13	258	251	232	41	65	66	63	0	99	58.76
	20	0.80	1.00	252.53	259	251	231	41	65	67	63	0	101	58.80
4	22.5	0.75	0.96	253.96	259	250	240	41	65	67	63	0	102	56.94
	25	0.75	0.96	255.35	259	250	240	41	65	67	63	0	102	56.94
	27.5	0.75	0.96	256.75	260	250	240	41	65	67	63	0	103	56.98
5	30	0.75	0.96	258.16	259	250	234	43	68	71	64	0	104	56.94
	32.5	0.75	0.96	259.59	259	250	234	43	68	71	64	0	100	56.94
	35	0.75	0.96	260.97	260	250	241	43	68	71	64	0	98	56.98
6	37.5	0.75	0.96	262.31	260	250	241	42	68	71	64	0	103	56.98
	40	0.75	0.96	263.73	258	251	247	42	68	70	65	0	100	56.90
	42.5	0.65	0.85	265.11	258	251	249	42	68	70	65	0	101	52.97
7	45	0.65	0.85	266.41	258	251	250	41	68	70	65	0	101	52.97
	47.5	0.70	0.90	267.71	258	250	246	43	69	71	66	0	101	54.97
	50	0.70	0.90	269.05	258	250	246	45	69	71	66	0	101	54.97
8	52.5	0.65	0.83	270.40	258	250	245	47	69	72	66	0	98	52.97
	55	0.65	0.83	271.66	258	250	245	47	69	72	66	0	62	52.97
	57.5	0.65	0.83	272.46	258	250	245	47	69	72	66	0	140	52.97
	60			274.26										
1	0	0.70	0.90	274.27	255	250	245	47	69	72	66	0	100	54.85
	2.5	0.70	0.88	275.61	258	247	233	43	69	70	67	0	98	54.97
	5	0.70	0.89	276.92	258	247	235	43	69	70	67	0	101	54.97
2	7.5	0.70	0.89	278.26	258	251	245	39	69	71	67	0	102	54.97
	10	0.70	0.89	279.62	258	248	234	41	70	72	68	0	101	54.97
	12.5	0.70	0.89	280.97	259	248	234	41	70	72	68	0	100	55.00
3	15	0.70	0.89	282.31	259	248	235	41	70	72	68	0	100	55.00
	17.5	0.70	0.89	283.65	260	250	251	46	71	73	69	0	94	55.04
	20	0.70	0.89	284.91	260	250	251	46	71	73	69	0	108	55.04
4	22.5	0.65	0.81	286.35	258	250	251	46	71	73	69	0	102	52.97
	25	0.65	0.81	287.67	260	250	251	46	71	73	68	0	101	53.04
	27.5	0.65	0.81	288.97	258	250	251	46	71	73	68	0	99	52.97
5	30	0.65	0.81	290.24	258	250	251	46	71	73	68	0	99	52.97
	32.5	0.65	0.81	291.51	258	250	251	46	71	73	68	0	103	52.97
	35	0.75	0.96	292.84	259	251	235	43	72	74	69	0	101	56.94
6	37.5	0.75	0.96	294.24	258	249	236	40	71	73	69	0	101	56.90
	40	0.75	0.96	295.64	259	251	240	40	71	73	69	0	100	56.94
	42.5	0.75	0.96	297.02	259	251	245	40	71	73	69	0	105	56.94
7	45	0.75	0.96	298.47	259	250	249	40	71	73	69	0	101	56.94
	47.5	0.75	0.96	299.87	259	250	241	40	73	75	70	0	101	56.94
	50	0.75	0.96	301.27	259	251	238	41	72	74	70	0	100	56.94
8	52.5	0.85	1.10	302.66	259	251	238	40	72	74	70	0	100	60.61
	55	0.85	1.10	304.14	259	251	251	40	72	74	70	0	102	60.61
	57.5	0.85	1.10	305.65	257	249	239	40	72	73	70	0	101	60.53
	60			307.14										
1	0	0.80	1.05	307.15	257	251	253	41	73	76	70	0	101	58.72
	2.5	0.80	1.05	308.60	257	251	253	41	70	70	70	0	95	58.72
	5	0.80	1.05	309.95	257	250	252	41	70	70	70	0	108	58.72
2	7.5	0.80	1.05	311.49	257	250	251	38	72	73	70	0	100	58.72
	10	0.80	1.05	312.92	257	251	252	38	72	73	70	0	101	58.72
	12.5	0.80	1.05	314.37	257	257	251	38	72	73	70	0	102	58.72
3	15	0.80	1.05	315.83	256	248	250	40	72	74	70	0	100	58.68
	17.5	0.75	0.95	317.27	256	251	250	40	71	73	69	0	102	56.82
	20	0.75	0.95	318.69	257	251	249	40	71	73	69	0	100	56.86
4	22.5	0.75	0.95	320.07	257	250	252	40	71	73	69	0	99	56.86
	25	0.75	0.95	321.44	256	248	249	40	71	73	69	0	99	56.82
	27.5	0.75	0.95	322.82	258	240	249	40	71	73	69	0	100	56.90
5	30	0.75	0.95	324.20	258	240	250	40	71	73	69	0	100	56.90
	32.5	0.75	0.95	325.58	258	240	250	40	71	73	69	0	100	56.90
	35	0.75	0.95	326.96	256	253	251	39	71	72	69	0	100	56.82
6	37.5	0.65	0.85	328.34	259	255	251	39	71	72	69	0	101	53.00
	40	0.65	0.85	329.64	251	249	250	38	70	72	68	0	100	52.71
	42.5	0.65	0.85	330.94	257	253	251	41	71	73	68	0	101	52.93
7	45	0.65	0.85	332.24	256	249	250	41	71	73	68	0	101	52.89
	47.5	0.65	0.85	333.54	256	249	251	41	71	73	68	0	101	52.89
	50	0.65	0.85	334.84	256	249	251	41	71	73	68	0	101	52.89
8	52.5	0.65	0.85	336.14	257	252	251	39	70	71	68	0	101	52.93
	55	0.65	0.85	337.44	257	251	250	39	70	71	68	0	101	52.93
	57.5	0.65	0.85	338.74	255	238	248	39	70	71	68	0	112	52.86
	60			340.19										
1	0	0.65	0.85	340.19	256	236	247	41	68	68	67	0	101	52.89
	2.5	0.65	0.85	341.49	256	233	236	39	68	68	67	0	100	52.89
	5	0.65	0.85	342.77	254	232	237	38	68	68	67	0	102	52.82
2	7.5	0.65	0.85	344.08	253	237	237	37	68	69	67	0	99	52.78
	10	0.65	0.85	345.36	251	239	235	37	68	69	67	0	100	52.71
	12.5	0.65	0.85	346.65	255	240	239	37	68	69	67	0	100	52.86
3	15	0.65	0.85	347.93	255	241	241	37	68	69	67	0	101	52.86
	17.5	0.65	0.85	349.23	254	227	247	41	69	71	67	0	99	52.82
	20	0.65	0.85	350.51	254	232	241	41	69	71	67	0	100	52.82
4	22.5	0.65	0.85	351.80	254	232	241	41	69	71	67	0	101	52.82
	25	0.70	0.91	353.10	254	235	241	41	69	71	67	0	102	54.81
	27.5	0.70	0.90	354.46	257	239	240	37	68	69	67	0	101	54.93
5	30	0.70	0.90	355.80	257	233	238	37	68	69	67	0	100	54.93
	32.5	0.80	1.00	357.13	258	238	244	37	68	69	67	0	100	58.76
	35	0.80	1.00	358.55	258	244	244	37	68	68	67	0	108	58.76
6	37.5	0.78	1.00	360.09	259	248	244	37	67	68	66	0	101	58.06
	40	0.78	0.97	361.50	259	248	244	37	67	68	66	0	99	58.06
	42.5	0.78	0.97	362.88	258	252	242	37	67	68	66	0	101	58.02
7	45	0.79	0.99	364.30	259	244	249	37	67	68	66	0	100	58.43
	47.5	0.79	0.99	365.71	257	249	247	37	67	68	66	0	101	58.35
	50	0.79	0.99	367.13	258	252	250	38	68	69	66	0	100	58.39
8	52.5	0.79	0.99	368.54	258	250	250	38	68	69	66	0	103	58.39
	55	0.80	1.00	370.00	258	253	252	39	68	69	66	0	99	58.76
	57.5	0.80	1.00	371.40	559	246	243	39	68	69	66	0	121	70.00
	60			372.84										
Post-test Leak Check =	<0.01 at 12" Hg													
	Average	0.732	0.938	131.82	260	247	244	41	69				101	56.55

TPM and Metals Sampling Results
Alt Fuels: Metals, December

Test :	Test #1			Test #2			Test #3			AVERAGE RESULTS	
Sample Volume (Rm^3) [1] :	4.55			4.04			4.07				
Stack Flow Rate (Rm^3/s) [1] :	288.2			278.9			286.5			284.5	
Parameter	**Lab Data**	**Concentration**	**Emission Rate**	**Lab Data**	**Concentration**	**Emission Rate**	**Lab Data**	**Concentration**	**Emission Rate**	**Concentration**	**Emission Rate**
Particulate	**(mg)**	**(mg/m^3)**	**(mg/s)**	**(mg)**	**(mg/m^3)**	**(mg/s)**	**(mg)**	**(mg/m^3)**	**(mg/s)**	**(mg/m^3)**	**(mg/s)**
Particulate in Acetone Rinse	84.7	-	-	30.8	-	-	68.8	-	-	-	-
Particulate on Filter	< 0.30	-	-	< 0.30	-	-	1.80	-	-	-	-
Total Particulate Matter	< 85.0	< 18.7	< 5390	< 31.1	< 7.7	< 2150	70.6	17.3	4970	< 14.6	4170
Metals	**(µg)**	**(µg/m^3^)**	**(mg/s)**	**(µg)**	**(µg/m^3^)**	**(mg/s)**	**(µg)**	**(µg/m^3^)**	**(mg/s)**	**(µg/m^3^)**	**(mg/s)**
Combined Train Aluminum (Al)	384	84.4	24.3	247	61.1	17.0	311	76.4	21.9	74.0	21.1
Combined Train Antimony (Sb)	< 7.5	< 1.65	< 0.475	< 7.5	< 1.86	< 0.518	< 7.5	< 1.84	< 0.528	< 1.78	< 0.507
Combined Train Arsenic (As)	< 2.0	< 0.440	< 0.127	< 2.0	< 0.495	< 0.138	< 2.0	< 0.491	< 0.141	< 0.475	< 0.135
Combined Train Barium (Ba)	33.1	7.280	2.10	23.8	5.89	1.64	28.3	6.95	1.99	6.71	1.91
Combined Train Beryllium (Be)	< 0.45	< 0.099	< 0.029	< 0.45	< 0.111	< 0.0311	< 0.45	< 0.111	< 0.0317	< 0.107	< 0.0304
Combined Train Boron (B)	< 75	< 16.5	< 4.75	< 75	< 18.6	< 5.18	< 75	< 18.4	< 5.28	< 17.8	< 5.07
Combined Train Cadmium (Cd)	< 0.45	< 0.099	< 0.029	< 0.45	< 0.111	< 0.031	< 0.45	< 0.111	< 0.0317	< 0.107	< 0.0304
Combined Train Calcium (Ca)	2640	581	167	2110	522	146	2270	558	160	553	158
Combined Train Chromium (Cr)	< 7.5	< 1.65	< 0.475	< 7.5	< 1.86	< 0.518	< 7.5	< 1.84	< 0.528	< 1.78	< 0.507
Combined Train Cobalt (Co)	0.48	0.106	0.030	< 0.45	< 0.111	< 0.0311	0.50	0.123	0.0352	< 0.113	< 0.0322
Combined Train Copper (Cu)	6.1	1.34	0.387	< 3.8	< 0.940	< 0.262	6.7	1.65	0.472	< 1.31	< 0.373
Combined Train Iron (Fe)	341	75.0	21.6	246	60.9	17.0	459	113	32.3	82.9	23.6
Combined Train Lead (Pb)	4.5	0.99	0.285	3.9	0.965	0.269	4.9	1.20	0.345	1.05	0.300
Combined Train Magnesium (Mg)	339	74.5	21.5	233	57.7	16.1	250	61.4	17.6	64.5	18.4
Combined Train Manganese (Mn)	43.2	9.50	2.74	23.9	5.91	1.650	38.8	9.53	2.73	8.32	2.37
Combined Train Molybdenum (Mo)	11.1	2.44	0.703	12.1	2.99	0.835	12.6	3.10	0.887	2.84	0.808
Combined Train Nickel (Ni)	7.3	1.61	0.463	4.4	1.09	0.304	6.9	1.70	0.486	1.46	0.417
Combined Train Phosphorus (P)	< 230	< 50.6	< 14.6	< 230	< 56.9	< 15.9	< 230	< 56.5	< 16.2	< 54.7	< 15.5
Combined Train Potassium (K)	504	111	31.9	< 300	< 74.2	< 20.7	387	95.1	27.2	< 93.4	< 26.6
Combined Train Selenium (Se)	< 5.0	< 1.10	< 0.317	< 5.0	< 1.24	< 0.345	< 5.0	< 1.23	< 0.352	< 1.19	< 0.338
Combined Train Silver (Ag)	< 0.60	< 0.13	< 0.038	< 0.60	< 0.148	< 0.0414	0.81	0.199	0.0570	< 0.160	< 0.0455
Combined Train Strontium (Sr)	8.6	1.89	0.545	6.8	1.68	0.469	6.8	1.67	0.479	1.75	0.498
Combined Train Thallium (Tl)	< 0.60	< 0.13	< 0.0380	< 0.60	< 0.148	< 0.0414	< 0.60	< 0.147	< 0.0422	< 0.143	< 0.0406
Combined Train Tin (Sn)	44.9	9.87	2.85	48.6	12.0	3.35	54.1	13.3	3.81	11.7	3.34
Combined Train Titanium (Ti)	30.8	6.77	1.95	25.8	6.38	1.78	26.0	6.39	1.83	6.52	1.85
Combined Train Vanadium (V)	< 1.5	< 0.330	< 0.0951	< 1.5	< 0.371	< 0.104	< 1.5	< 0.369	< 0.106	< 0.357	< 0.101
Combined Train Zinc (Zn)	52	11.4	3.30	< 25	< 6.19	< 1.73	49	12.0	3.45	< 9.89	< 2.82
Mercury	**(µg)**	**(µg/m^3^)**	**(mg/s)**	**(µg)**	**(µg/m^3^)**	**(mg/s)**	**(µg)**	**(µg/m^3^)**	**(mg/s)**	**(µg/m^3^)**	**(mg/s)**
Filterable Hg	2.336	-	-	2.22	-	-	1.183	-	-	-	-
Non-Filterable Hg	2.8840	-	-	3.352	-	-	1.7024	-	-	-	-
Total Hg	5.22	1.15	0.3310	5.57	1.38	0.3850	2.89	0.71	0.2030	1.1	0.306

Notes :

[1] Sample volume and volumetric flow rate based on dry referenced conditions (101.3 kPa and 25 °C)

'<' indicates that laboratory results were below the detection limit. The Method Detection Limit (RDL) was used to calculate the concentration and emission rate.

Concentration and Emission Rate has been reported to 3 significant figures.

TPM and Metals Sampling
Alt Fuels: Metals, December

Facility: St. Mary's Cement					**Operator:** TFL	
City: Bowmanville					**Entered by:** TFL	
Source: Main Stack					**Checked by:** DO	
Reference Method: US EPA Method 5/29						
DATA INPUTS	**Symbol**	**Units**	**Test #1** TPM/Metals	**Test #1** (Nozzle Change)	**Test #2** TPM/Metals	**Test #3** TPM/Metals
Date			4-Dec-18		5-Dec-18	6-Dec-18
Start Time			1:02 PM		9:06 AM	9:08 AM
End Time			6:25 PM		1:30 PM	6:18 PM
Round Stack, Diameter (Inside)	d_s	in	216		216	216
Standard Temperature	T_s	°F	77		77	77
Standard Pressure	P_s	in.Hg	29.92		29.92	29.92
Nozzle Diameter	D_n	in	0.230	0.216	0.216	0.216
Average Stack Temperature	T_s	°F	252		245	238
Average Meter Temperature	T_m	°F	54		53	42
Barometric Pressure	P_{bar}	" Hg	29.6		29.5	29.5
Stack Static Pressure	P_g	" H_2O	-0.7		-0.7	-0.7
Average Delta H	dH	" H_2O	1.80		1.80	1.70
Average Velocity Head (root mean square)	dP_{rms}	" H_2O	0.824		0.788	0.776
Pitot Coefficient	C_p	-	0.840	0.838	0.838	0.838
	Pitot ID :		RWDI 7' #3			
Gas Sample Volume	V_m	ft³	156.55		139.53	137.52
DGM Calibration Factor	Y	-	0.998		0.998	0.998
	DGM ID:		Envirosolve #2			
Total Sampling Time	min	minutes	240		240	240
Stack Gas Oxygen Concentration	O_2	%	13.2		13.3	13.5
Stack Gas Carbon Dioxide Concentration	CO_2	%	10.9		11.0	10.8
Impinger Gain	W_w	g	338.7		335	229.7

TPM and Metals Sampling

Facility:	St. Mary's Cement	**Operator:**	TFL
City:	Bowmanville	**Entered by:**	TFL
Source:	Main Stack	**Checked by:**	DO
Reference Method:	US EPA Method 5/29		

Emissions Calculations	**Symbol**	**Units**	**Test #1** TPM / Metals	**Test #2** TPM / Metals	**Test #3** TPM / Metals	**AVERAGE** TPM / Metals
Nozzle Area	A_n	ft²	2.89E-04	2.54E-04	2.54E-04	
Stack Area	A_s	ft²	254.47	254.47	254.47	
Average Stack Temperature	T_s	°R	712	705	698	705
Average DGM Temperature	T_m	°R	514	513	502	
Sample Volume at Reference Conditions	V_{mStd}	ft³	160.70	142.80	143.81	
	$\mathbf{V_{mmstd}}$	**m³**	**4.55**	**4.04**	**4.07**	
Vol. of Water Vapour	V_{wStd}	ft³	16.26	16.06	11.03	
Water Fraction	B_{ws}		9.2%	10.1%	7.1%	8.8%
Molecular Weight, dry	M_d	g/mole	30.38	30.40	30.37	30.38
Molecular Weight, wet	M_w	g/mole	29.24	29.15	29.49	29.29
Absolute Stack Pressure	P_s	in. Hg	29.55	29.45	29.45	29.48
Stack Gas Velocity	U_s	ft/s	59.13	57.46	56.57	57.72
	$\mathbf{U_{sm}}$	**m/s**	**18.02**	**17.51**	**17.24**	17.59
Actual Gas Flow Rate	Q_{act}	acf/min	902,837	877,366	863,772	881,325
Dry Gas Flow Rate (dry, ref)	Q_{ref}	dscf/min	610,777	591,119	607,191	603,029
	$\mathbf{Q_{mref}}$	**m³/min**	**17291**	**16735**	**17190**	17,072
	Qmref (Actual O_2)	**m³/s**	**288.18**	**278.91**	**286.49**	284.53
Isokinetic Rate	I	%	103	101	99	101

TPM and Metals Sampling

Facility: St. Mary's Cement | **Operator:** TFL
City: Bowmanville | **Entered by:** TFL
Source: Main Stack | **Checked by:** DO
Reference Method: US EPA Method 5/29 | **Date:** 4-Dec-18
Run: Metals Test #1

Pt.	Time (min)	Velocity Press. ("H_2O)	Orifice Press. ("H_2O)	Meter Volume (^oF)	Stack Temp (^oF)	Probe Temp (^oF)	Box Temp (^oF)	Imp Temp (^oF)	Meter Temp (^oF)	Vac Pressure ("Hg)	Percentage Isokinetic (%)	Stack Velocity (ft/sec)
Traverse 1- East												
Pre-Test Leak Check =		<0.02 at 15" Hg										
1	0	0.84	1.20	659.13	232	246	240	32	52	0	79	58.80
	2.5	0.82	1.50	660.49	248	252	234	29	52	-4	95	58.77
	5	0.82	1.80	662.09	249	253	236	29	51	-4	101	58.81
2	7.5	0.83	2.00	663.79	248	252	224	30	51	-4	101	59.12
	10	0.81	2.30	665.50	247	252	225	31	52	-4	109	58.37
	12.5	0.82	2.20	667.32	248	251	229	31	52	-4	109	58.77
3	15	0.86	2.30	669.15	251	249	242	32	53	-5	109	60.31
	17.5	0.85	2.25	671.02	252	251	246	34	54	-5	108	60.00
	20	0.86	2.25	672.87	252	249	235	35	54	-5	108	60.35
4	22.5	0.86	2.25	674.72	252	249	248	36	55	-5	109	60.35
	25	0.84	2.25	676.59	251	251	245	39	56	-5	108	59.61
	27.5	0.85	2.25	678.44	252	250	250	40	56	-5	108	60.00
5	30	0.85	2.25	680.30	253	254	250	41	57	-5	109	60.04
	32.5	0.85	2.25	682.17	252	252	249	43	58	-5	107	60.00
	35	0.80	2.15	684.02	253	252	249	44	58	-5	107	58.25
6	37.5	0.81	2.15	685.81	252	252	236	44	59	-5	109	58.57
	40	0.84	2.25	687.64	252	251	237	43	59	-5	105	59.65
	42.5	0.82	2.20	689.44	253	252	238	44	59	-5	109	58.97
7	45	0.79	2.10	691.28	252	252	244	43	59	-5	110	57.85
	47.5	0.79	2.10	693.11	252	251	239	44	59	-5	108	57.85
	50	0.78	2.10	694.90	251	252	245	44	59	-5	108	57.44
8	52.5	0.77	2.10	696.68	251	252	244	44	59	-4.5	108	57.07
	55	0.77	2.10	698.46	252	254	246	45	59	-4.5	107	57.11
	57.5	0.77	2.10	700.22	251	252	245	45	59	-4.5	108	57.07
	60			702.00								
1	0	0.80	2.15	702.00	252	252	242	45	59	-4.5	110	58.21
	2.5	0.80	2.15	703.84	252	253	242	45	59	-4.5	109	58.21
	5	0.75	2.10	705.67	252	252	246	45	59	-4.5	110	56.36
2	7.5	0.77	2.15	707.46	253	253	243	46	59	-4.5	110	57.15
	10	0.79	2.15	709.26	253	252	242	45	58	-4.5	110	57.89
	12.5	0.76	2.10	711.08	253	252	237	44	58	-4.5	110	56.78
3	15	0.85	2.25	712.87	252	251	241	44	58	-4.5	105	60.00
	17.5	0.85	2.25	714.68	253	252	241	44	58	-4.5	110	60.04
	20	0.85	2.25	716.58	253	252	241	44	58	-4.5	109	60.04
4	22.5	0.83	2.20	718.45	252	253	245	46	59	-5	108	59.29
	25	0.83	2.20	720.30	254	252	245	46	59	-5	106	59.37
	27.5	0.86	2.25	722.11	252	253	253	46	59	-5	104	60.35
5	30	0.86	2.25	723.91	252	254	228	34	55	-4.5	106	60.35
	32.5	0.86	2.25	725.74	252	250	230	35	51	-4.5	108	60.35
	35	0.83	2.20	727.59	252	256	234	38	52	-4.5	108	59.29
6	37.5	0.84	2.20	729.41	252	256	236	38	53	-4.5	110	59.65
	40	0.86	2.25	731.27	253	255	236	41	53	-4.5	106	60.40
	42.5	0.86	2.25	733.08	253	251	240	42	54	-5	108	60.40
7	45	0.86	2.25	734.93	253	251	244	42	54	-5	108	60.40
	47.5	0.86	2.30	736.78	253	260	244	42	54	-5	108	60.40
	50	0.86	2.20	738.63	254	260	250	42	54	-5	108	60.44
8	52.5	0.86	2.20	740.48	254	260	251	42	54	-5	106	60.44
	55	0.86	2.20	742.30	253	262	255	42	54	-5	107	60.40
	57.5	0.86	2.20	744.13	254	260	260	42	54	-5	107	60.44
	60			745.96								
1	0	0.95	1.30	746.11	254	259	253	36	52	-2	88	63.52
	2.5	0.95	1.50	747.51	256	260	250	39	53	-2	103	63.61
	5	0.95	1.50	749.15	256	261	259	41	52	-2	88	63.61
2	7.5	0.95	1.50	750.54	256	259	256	41	52	-2	98	63.61
	10	0.95	1.60	752.10	256	259	258	41	52	-2	103	63.61
	12.5	0.93	1.30	753.73	256	255	258	41	52	-2	99	62.94
3	15	0.85	1.30	755.28	254	262	262	41	52	-2	96	60.09
	17.5	0.85	1.30	756.72	253	261	261	41	52	-2	97	60.04
	20	0.85	1.20	758.18	254	260	261	41	52	-2	98	60.09
4	22.5	0.82	1.20	759.65	254	260	243	41	52	-2	93	59.02
	25	0.82	1.20	761.03	253	260	226	43	52	-2	96	58.97
	27.5	0.82	1.40	762.45	256	259	231	43	52	-2	100	59.10
5	30	0.82	1.40	763.92	254	260	235	43	52	-2	100	59.02
	32.5	0.82	1.40	765.39	254	263	250	43	52	-2	97	59.02
	35	0.80	1.40	766.82	255	259	254	43	52	-2	96	58.33
6	37.5	0.72	1.10	768.22	254	258	257	43	52	-2	96	55.30
	40	0.72	1.20	769.55	253	259	260	43	52	-2	100	55.26
	42.5	0.72	1.20	770.93	252	262	261	43	52	-2	94	55.22
7	45	0.72	1.20	772.23	253	252	261	43	52	-2	99	55.26
	47.5	0.72	1.20	773.60	252	254	260	43	51	-2	100	55.22
	50	0.72	1.20	774.98	252	253	260	44	51	-2	99	55.22
8	52.5	0.72	1.20	776.35	252	250	260	44	51	-2	100	55.22
	55	0.72	1.20	777.73	252	250	261	44	51	-2	100	55.22
	57.5	0.72	1.20	779.12	252	250	260	46	52	-2	100	55.22
	60			780.50								
1	0	0.73	1.20	780.50	252	252	259	46	52	-2	99	55.61
	2.5	0.72	1.20	781.88	251	256	261	47	52	-2	99	55.18
	5	0.74	1.20	783.25	251	258	258	46	52	-2	98	55.95
2	7.5	0.75	1.20	784.63	252	259	261	45	52	-2	98	56.36
	10	0.75	1.25	786.01	251	258	261	46	52	-2	98	56.32
	12.5	0.75	1.25	787.40	251	261	261	46	52	-2	98	56.32
3	15	0.73	1.25	788.78	250	258	259	46	52	-2	100	55.53
	17.5	0.75	1.25	790.17	250	258	259	46	52	-2	98	56.28
	20	0.73	1.25	791.56	250	259	260	47	52	-2	99	55.53
4	22.5	0.81	1.30	792.94	251	261	260	46	52	-2	97	58.53
	25	0.86	1.35	794.36	252	259	259	46	52	-2	97	60.35
	27.5	0.86	1.40	795.82	252	259	260	46	52	-2	95	60.35
5	30	0.90	1.50	797.26	253	258	260	46	52	-2	101	61.78
	32.5	0.92	1.55	798.82	252	259	260	46	52	-3	97	62.42
	35	0.89	1.55	800.34	251	259	259	46	53	-3	101	61.35
6	37.5	0.90	1.55	801.90	251	258	261	46	53	-3	99	61.70
	40	0.88	1.55	803.44	251	262	260	47	53	-3	100	61.01
	42.5	0.90	1.55	804.98	251	258	259	47	53	-3	101	61.70
7	45	0.88	1.55	806.55	250	261	259	47	53	-3	100	60.97
	47.5	0.88	1.55	808.08	250	258	259	47	53	-3	100	60.97
	50	0.86	1.55	809.62	250	258	260	49	53	-3	103	60.27
8	52.5	0.86	1.55	811.18	251	261	259	48	53	-3	102	60.31
	55	0.88	1.55	812.72	252	262	260	48	53	-3	102	61.05
	57.5	0.88	1.55	814.28	251	258	261	49	53	-3	101	61.01
	60			815.83								
Post-test Leak Check =		<0.01 at 14" Hg										
	Average	0.824	1.752	156.55	252	256	249	42	54		103	59.13

TPM and Metals Sampling

Facility: St. Mary's Cement
City: Bowmanville
Source: Main Stack
Reference Method: US EPA Method 5/29
Run: Metals Test #2

Operator: TFL
Entered by: TFL
Checked by: DO
5-Dec-18

Pt.	Time (min)	Velocity Press. ("H_2O)	Orifice Press. ("H_2O)	Meter Volume (^oF)	Stack Temp (^oF)	Probe Temp (^oF)	Box Temp (^oF)	Imp Temp (^oF)	Meter Temp (^oF)	Vac Pressure ("Hg)	Percentage Isokinetic (%)	Stack Velocity (ft/sec)
Traverse 1- South												
Pre-Test Leak Check =	<0.02 at 12" Hg											
1	0	0.79	1.30	816.07	246	259	259	25	33	-4	97	57.66
	2.5	0.79	1.40	817.42	247	261	260	25	35	-3	103	57.70
	5	0.76	1.35	818.85	245	257	260	27	35	-3	103	56.51
2	7.5	0.80	1.40	820.26	247	263	260	28	36	-3	102	58.06
	10	0.75	1.30	821.70	247	258	261	31	36	-3	103	56.22
	12.5	0.81	1.40	823.10	247	260	261	33	37	-3	103	58.42
3	15	0.76	1.30	824.56	248	261	261	35	38	-3	102	56.63
	17.5	0.81	0.40	825.96	247	261	250	35	39	-3	35	58.42
	20	0.83	1.45	826.46	247	261	255	36	40	-3	103	59.14
4	22.5	0.78	1.30	827.94	244	260	250	37	40	-3	104	57.21
	25	0.75	1.20	829.40	247	258	249	37	40	-3	105	56.22
	27.5	0.76	1.20	830.84	247	258	251	37	40	-3	106	56.59
5	30	0.76	1.20	832.30	247	258	251	37	41	-3	95	56.59
	32.5	0.81	1.30	833.61	248	260	251	35	42	-2	95	58.46
	35	0.80	1.35	834.97	250	259	252	36	42	-2	99	58.18
6	37.5	0.78	1.35	836.38	248	259	252	36	43	-2	100	57.37
	40	0.78	1.35	837.79	250	262	250	36	43	-2	100	57.45
	42.5	0.78	1.35	839.20	250	261	248	37	43	-2	100	57.45
7	45	0.78	1.35	840.61	250	260	248	37	44	-2	100	57.45
	47.5	0.74	1.30	842.02	250	261	255	37	44	-2	102	55.96
	50	0.76	1.30	843.42	251	258	262	37	45	-2	99	56.75
8	52.5	0.76	1.30	844.80	252	261	262	38	45	-2	101	56.79
	55	0.80	1.35	846.20	252	258	262	39	46	-2	102	58.27
	57.5	0.75	1.30	847.66	252	260	261	39	46	-2	100	56.42
	60			849.05								
1	0	0.76	1.30	849.05	251	260	261	39	46	-2	102	56.75
	2.5	0.77	1.35	850.47	251	260	261	40	47	-2	103	57.12
	5	0.76	1.35	851.92	251	259	261	40	48	-2	102	56.75
2	7.5	0.80	1.35	853.34	251	257	260	41	49	-2	106	58.23
	10	0.76	1.30	854.87	251	258	259	41	49	-2	99	56.75
	12.5	0.80	1.35	856.26	251	260	261	41	50	-2	96	58.23
3	15	0.80	1.45	857.64	250	261	259	41	49	-2	103	58.18
	17.5	0.80	1.45	859.13	251	261	259	41	49	-2	106	58.23
	20	0.78	1.40	860.65	251	258	258	41	49	-2	101	57.49
4	22.5	0.81	1.45	862.09	252	261	255	43	51	-2	103	58.63
	25	0.76	1.40	863.58	257	252	245	44	51	-2	106	56.99
	27.5	0.78	1.40	865.06	249	257	261	45	52	-2	105	57.41
5	30	0.80	1.40	866.56	249	257	257	45	52	-2	101	58.14
	32.5	0.80	1.40	868.02	251	261	255	45	52	-2	104	58.23
	35	0.82	1.40	869.52	251	260	252	45	52	-2	102	58.95
6	37.5	0.80	1.40	871.01	250	261	250	45	53	-2	101	58.18
	40	0.80	1.40	872.48	250	260	250	47	54	-2	100	58.18
	42.5	0.80	1.40	873.94	255	257	251	49	54	-2	103	58.39
7	45	0.76	1.35	875.43	251	261	248	50	54	-2	102	56.75
	47.5	0.76	1.35	876.87	251	260	250	49	54	-2	104	56.75
	50	0.76	1.35	878.34	250	257	259	48	54	-2	104	56.71
8	52.5	0.78	1.35	879.81	250	261	261	47	55	-2	101	57.45
	55	0.78	1.35	881.27	249	259	261	45	55	-2	101	57.41
	57.5	0.78	1.35	882.73	250	258	262	45	56	-2	103	57.45
	60			884.21								
1	0	0.80	1.35	884.21	250	258	262	33	53	-2	101	58.18
	2.5	0.85	1.40	885.68	250	259	260	33	53	-2	94	59.98
	5	0.86	1.45	887.09	249	257	260	40	54	-3	103	60.28
2	7.5	0.84	1.45	888.64	248	260	260	44	54	-3	99	59.54
	10	0.84	1.45	890.11	247	259	260	51	55	-3	102	59.50
	12.5	0.84	1.45	891.63	245	261	260	53	56	-3	103	59.41
3	15	0.88	1.50	893.18	246	257	259	53	56	-3	99	60.85
	17.5	0.88	1.50	894.70	245	256	259	53	56	-3	98	60.81
	20	0.90	1.55	896.20	245	259	262	55	57	-3	103	61.50
4	22.5	0.90	1.55	897.80	244	258	259	54	58	-3	99	61.45
	25	0.85	1.50	899.35	243	261	259	54	59	-3	103	59.68
	27.5	0.87	1.50	900.91	244	259	261	53	59	-3	101	60.42
5	30	0.86	1.50	902.46	243	258	260	51	60	-3	104	60.03
	32.5	0.87	1.50	904.05	244	258	258	51	60	-3	98	60.42
	35	0.84	1.50	905.56	242	260	259	50	60	-3	101	59.28
6	37.5	0.69	1.10	907.09	242	261	260	50	61	-3	100	53.73
	40	0.70	1.15	908.46	242	258	259	58	61	-3	99	54.12
	42.5	0.71	1.15	909.84	240	261	258	48	61	-3	98	54.43
7	45	0.60	1.10	911.21	239	261	259	47	61	-3	105	50.00
	47.5	0.60	1.05	912.56	239	260	259	46	62	-3	101	50.00
	50	0.60	1.05	913.86	239	260	261	46	63	-2	101	50.00
8	52.5	0.60	1.05	915.17	239	260	261	46	63	-2	100	50.00
	55	0.60	1.05	916.46	239	259	261	44	64	-2	101	50.00
	57.5	0.60	1.05	917.77	239	259	257	44	64	-2	101	50.00
	60			919.08								
1	0	0.85	1.45	919.08	239	260	257	44	62	-2	103	59.51
	2.5	0.85	1.45	920.66	239	263	260	39	62	-3	95	59.51
	5	0.86	1.50	922.11	240	259	260	40	62	-3	98	59.90
2	7.5	0.85	1.55	923.62	240	259	259	40	62	-3	100	59.55
	10	0.85	1.55	925.16	240	258	260	39	63	-3	104	59.55
	12.5	0.86	1.55	926.75	239	260	262	39	63	-3	102	59.86
3	15	0.83	1.50	928.32	239	258	259	39	62	-3	101	58.80
	17.5	0.80	1.50	929.85	240	259	261	39	62	-3	107	57.77
	20	0.85	1.50	931.44	239	261	260	39	62	-3	104	59.51
4	22.5	0.85	1.50	933.03	239	261	261	38	63	-3	101	59.51
	25	0.85	1.50	934.59	238	257	261	38	62	-3	104	59.47
	27.5	0.87	1.50	936.18	238	260	259	38	63	-3	100	60.16
5	30	0.82	1.50	937.74	239	258	260	38	63	-3	105	58.45
	32.5	0.85	1.50	939.32	238	261	260	37	63	-3	101	59.47
	35	0.85	1.50	940.87	239	259	261	37	63	-3	100	59.51
6	37.5	0.85	1.50	942.41	238	261	260	37	63	-3	105	59.47
	40	0.85	1.50	944.02	238	258	259	37	63	-3	102	59.47
	42.5	0.84	1.45	945.59	239	261	259	37	63	-3	100	59.16
7	45	0.83	1.45	947.12	238	260	259	37	63	-3	99	58.76
	47.5	0.70	1.15	948.63	238	259	260	37	63	-3	98	53.96
	50	0.72	1.20	950.00	235	261	259	36	63	-3	99	54.61
8	52.5	0.70	1.20	951.40	235	259	260	36	62	-3	101	53.85
	55	0.70	1.20	952.81	235	261	260	36	62	-3	100	53.85
	57.5	0.70	1.20	954.21	236	260	260	35	62	-3	100	53.89
	60			955.60								
Post-test Leak Check =	<0.01 at 12" Hg											
	Average	0.788	1.356	139.53	245	259	258	41	53		101	57.46

TPM and Metals Sampling

Facility: St. Mary's Cement
City: Bowmanville
Source: Main Stack
Reference Method: US EPA Method 5/29
Run: Metals Test #3

Operator: TFL
Entered by: TFL
Checked by: DO
6-Dec-18

Pt.	Time (min)	Velocity Press. ("H_2O)	Orifice Press. ("H_2O)	Meter Volume (^oF)	Stack Temp (^oF)	Probe Temp (^oF)	Box Temp (^oF)	Imp Temp (^oF)	Meter Temp (^oF)	Flex Line Temp (^oF)	Vac Pressure ("Hg)	Percentage Isokinetic (%)	Stack Velocity (ft/sec)
Traverse 1- South													
Pre-Test Leak Check =		<0.02 at 15" Hg											
1	0	0.75	1.15	956.06	244	238	259	26	30	227	-1	91	55.77
	2.5	0.78	1.25	957.32	248	251	261	26	34	228	-1	97	57.03
	5	0.82	1.35	958.69	248	244	261	27	34	227	-1	96	58.48
2	7.5	0.82	1.40	960.09	248	239	256	27	34	226	-1	100	58.48
	10	0.82	1.40	961.55	246	235	255	27	34	226	-1	100	58.39
	12.5	0.82	1.40	963.01	246	239	259	27	35	225	-1	100	58.39
3	15	0.79	1.35	964.47	245	248	258	28	36	225	-1	101	57.27
	17.5	0.74	1.30	965.92	246	252	263	28	36	225	-1	102	55.47
	20	0.75	1.30	967.34	247	259	261	28	37	226	-1	101	55.88
4	22.5	0.70	1.30	968.75	246	259	257	28	37	227	-1	103	53.95
	25	0.72	1.30	970.15	246	260	256	29	38	227	-1	103	54.72
	27.5	0.74	1.30	971.57	248	259	258	29	39	228	-1	102	55.55
5	30	0.75	1.30	973.00	247	254	258	29	39	228	-1	102	55.88
	32.5	0.75	1.30	974.43	247	261	261	29	40	228	-1	101	55.88
	35	0.72	1.30	975.85	246	254	261	30	40	228	-1	102	54.72
6	37.5	0.75	1.25	977.26	249	259	259	30	40	228	-1	100	55.96
	40	0.75	1.25	978.67	248	254	262	30	41	228	-1	100	55.92
	42.5	0.75	1.25	980.08	249	246	257	30	41	227	-1	99	55.96
7	45	0.73	1.25	981.48	249	244	259	30	42	227	-1	100	55.21
	47.5	0.69	1.20	982.87	248	250	262	30	42	226	-1	102	53.64
	50	0.69	1.20	984.25	248	247	258	30	42	225	-1	102	53.64
8	52.5	0.71	1.20	985.64	248	254	261	30	42	226	-1	99	54.41
	55	0.70	1.20	987.00	248	254	261	30	43	227	-1	101	54.03
	57.5	0.70	1.20	988.38	245	259	257	30	43	227	-1	100	53.91
	60			989.75									
1	0	0.74	1.20	989.75	244	260	257	30	43	227	-1	96	55.39
	2.5	0.71	1.20	991.10	237	249	257	28	41	228	-1	99	53.99
	5	0.69	1.20	992.47	237	253	251	27	41	225	-1	101	53.22
2	7.5	0.70	1.20	993.85	238	251	257	28	41	225	-1	100	53.64
	10	0.72	1.20	995.22	238	250	259	28	41	225	-1	98	54.41
	12.5	0.72	1.20	996.59	237	243	254	28	41	224	-1	98	54.37
3	15	0.72	1.20	997.96	236	249	261	29	41	224	-1	97	54.33
	17.5	0.69	1.20	999.32	237	244	261	30	42	226	-1	100	53.22
	20	0.76	1.25	1000.69	238	253	263	30	42	225	-1	97	55.90
4	22.5	0.75	1.25	1002.08	237	254	256	30	43	225	-1	97	55.49
	25	0.75	1.25	1003.47	237	255	262	31	43	226	-1	96	55.49
	27.5	0.77	1.25	1004.84	237	254	256	32	43	226	-1	96	56.22
5	30	0.76	1.25	1006.23	239	246	260	32	44	226	-1	97	55.94
	32.5	0.76	1.30	1007.62	239	242	261	31	44	226	-1	99	55.94
	35	0.80	1.30	1009.05	239	240	257	31	44	226	-1	99	57.39
6	37.5	0.75	1.30	1010.51	239	251	260	31	44	226	-1	96	55.57
	40	0.75	1.30	1011.88	239	237	256	31	44	226	-1	99	55.57
	42.5	0.80	1.35	1013.30	239	236	254	31	44	226	-1	100	57.39
7	45	0.84	1.40	1014.78	239	234	253	31	44	226	-1	95	58.81
	47.5	0.80	1.40	1016.22	238	232	251	31	44	225	-1	100	57.35
	50	0.83	1.40	1017.69	239	232	257	33	44	225	-1	97	58.46
8	52.5	0.80	1.40	1019.15	237	233	260	31	43	225	-1	100	57.31
	55	0.81	1.40	1020.62	236	236	259	31	44	225	-1	99	57.62
	57.5	0.81	1.40	1022.09	236	236	261	32	44	225	-1	101	57.62
	60			1023.59									
1	0	0.85	1.45	23.59	233	265	229	28	40	223	-1	99	58.90
	2.5	0.89	1.50	25.09	233	260	225	29	36	223	-1	99	60.27
	5	0.87	1.50	26.61	234	255	254	30	41	228	-1	100	59.63
2	7.5	0.86	1.45	28.14	234	250	262	30	41	227	-1	97	59.29
	10	0.87	1.50	29.62	234	248	257	30	41	227	-1	98	59.63
	12.5	0.90	1.55	31.13	233	240	258	31	41	227	-1	98	60.61
3	15	0.85	1.50	32.66	234	242	262	31	42	227	-1	99	58.94
	17.5	0.85	1.50	34.17	233	241	253	32	42	228	-1	99	58.90
	20	0.84	1.50	35.68	232	243	262	32	43	228	-1	100	58.51
4	22.5	0.85	1.50	37.19	232	240	256	32	43	228	-1	99	58.86
	25	0.84	1.50	38.70	231	234	256	32	43	228	-1	100	58.47
	27.5	0.82	1.50	40.21	232	237	251	32	43	228	-1	100	57.81
5	30	0.86	1.50	41.71	232	236	257	32	43	228	-1	98	59.20
	32.5	0.85	1.50	43.21	233	238	263	32	43	228	-1	99	58.90
	35	0.90	1.55	44.72	232	240	262	32	43	230	-1	100	60.57
6	37.5	0.85	1.50	46.29	233	234	264	32	44	229	-1	96	58.90
	40	0.79	1.40	47.76	233	237	255	32	44	230	-1	98	56.78
	42.5	0.79	1.40	49.21	234	241	260	32	44	231	-1	99	56.83
7	45	0.65	1.30	50.67	233	243	258	32	44	233	-1	104	51.51
	47.5	0.66	1.30	52.06	233	247	263	32	45	235	-1	107	51.90
	50	0.67	1.25	53.50	231	251	259	32	45	234	-1	101	52.22
8	52.5	0.70	1.25	54.88	233	226	263	32	45	235	-1	101	53.45
	55	0.71	1.25	56.28	236	234	259	28	43	238	-1	101	53.95
	57.5	0.70	1.25	57.68	235	232	259	28	43	234	-1	102	53.53
	60			59.09									
1	0	0.70	1.25	59.09	235	232	260	28	44	223	-1	100	53.53
	2.5	0.68	1.25	60.47	236	232	261	28	44	232	-1	101	52.80
	5	0.69	1.25	61.85	236	234	261	29	45	232	-1	102	53.18
2	7.5	0.69	1.25	63.25	235	233	260	29	45	233	-1	102	53.15
	10	0.70	1.25	64.65	234	229	261	29	45	233	-1	101	53.49
	12.5	0.71	1.25	66.06	234	234	260	30	45	232	-1	99	53.87
3	15	0.72	1.25	67.44	235	234	261	30	46	233	-1	99	54.29
	17.5	0.72	1.25	68.83	235	241	260	31	46	234	-1	98	54.29
	20	0.73	1.25	70.21	235	254	254	31	46	234	-1	97	54.66
4	22.5	0.74	1.30	71.59	236	258	260	32	46	234	-1	99	55.08
	25	0.76	1.30	73.00	234	258	261	32	46	236	-1	99	55.74
	27.5	0.75	1.30	74.44	235	238	262	28	43	241	-1	96	55.41
5	30	0.79	1.30	75.82	236	239	262	28	44	237	-1	95	56.91
	32.5	0.78	1.35	77.21	235	229	260	28	45	233	-1	98	56.51
	35	0.78	1.35	78.64	237	237	260	28	45	232	-1	99	56.59
6	37.5	0.80	1.35	80.09	237	230	260	29	45	231	-1	95	57.31
	40	0.80	1.40	81.50	237	230	261	29	46	231	-1	98	57.31
	42.5	0.80	1.40	82.96	237	230	261	29	46	232	-1	99	57.31
7	45	0.93	1.45	84.43	236	233	260	29	47	233	-1	94	61.74
	47.5	0.92	1.50	85.93	236	237	261	29	47	233	-1	93	61.41
	50	0.90	1.55	87.41	237	230	258	30	47	234	-1	96	60.78
8	52.5	0.93	1.60	88.93	235	230	260	30	47	234	-1	96	61.70
	55	0.93	1.60	90.47	235	228	261	30	47	234	-1	97	61.70
	57.5	0.93	1.60	92.02	236	233	263	30	47	234	-1	97	61.74
	60			93.58									
Post-test Leak Check =		<0.01 at 12" Hg											
	Average	0.776	1.339	137.52	238	243	258	30	42	229		99	56.57

TPM and Metals Sampling Results
Kiln Stack baseline

Test :	Test #1			Test #2			Test #3			AVERAGE RESULTS	
Sample Volume (Rm^3) [1] :	4.13			4.12			4.00				
Stack Flow Rate (Rm^3/s) [1] :	288.4			290.0			280.9			286.4	
Parameter	**Lab Data**	**Concentration**	**Emission Rate**	**Lab Data**	**Concentration**	**Emission Rate**	**Lab Data**	**Concentration**	**Emission Rate**	**Concentratio**	**Emission Rate**
Particulate	**(mg)**	**(mg/m³)**	**(mg/s)**	**(mg)**	**(mg/m³)**	**(mg/s)**	**(mg)**	**(mg/m³)**	**(mg/s)**	**(mg/m³)**	**(mg/s)**
Particulate in Acetone Rinse	68.7	-	-	63.6	-	-	42.9	-	-	-	-
Particulate on Filter	0.3	-	-	< 0.3	-	-	< 0.3	-	-	-	-
Total Particulate Matter	69.0	16.7	4820	< 63.9	< 15.5	< 4500	< 43.2	< 10.8	< 3040	< 14.3	4120
Metals		**(µg/m³)**	**(mg/s)**	**(µg)**	**(µg/m³)**	**(mg/s)**	**(µg)**	**(µg/m³)**	**(mg/s)**	**(µg/m³)**	**(mg/s)**
Combined Train Aluminum (Al)	212	51.4	14.8	232	56.4	16.3	185	46.3	13.0	51.3	14.7
Combined Train Antimony (Sb)	< 7.5	< 1.82	< 0.524	< 7.5	< 1.82	< 0.528	< 7.5	< 1.88	< 0.527	< 1.84	< 0.526
Combined Train Arsenic (As)	< 2.0	< 0.485	< 0.140	< 2.0	< 0.486	< 0.141	< 2.0	< 0.501	< 0.141	< 0.490	< 0.140
Combined Train Barium (Ba)	25.1	6.08	1.75	25.4	6.17	1.79	20.7	5.18	1.46	5.81	1.67
Combined Train Beryllium (Be)	< 0.45	< 0.109	< 0.0314	< 0.45	< 0.109	< 0.0317	< 0.45	< 0.113	< 0.0316	< 0.110	< 0.0316
Combined Train Boron (B)	< 75	< 18.2	< 5.24	< 75	< 18.2	< 5.28	< 75	< 18.8	< 5.27	< 18.4	< 5.26
Combined Train Cadmium (Cd)	< 0.45	< 0.109	< 0.0314	< 0.45	< 0.109	< 0.032	< 0.45	< 0.113	< 0.0316	< 0.110	< 0.0316
Combined Train Calcium (Ca)	1230	298	85.9	1370	333	96.5	922	231	64.8	287	82.4
Combined Train Chromium (Cr)	< 7.5	< 1.82	< 0.524	< 7.5	< 1.82	< 0.528	< 7.5	< 1.88	< 0.527	< 1.84	< 0.526
Combined Train Cobalt (Co)	< 0.45	< 0.109	< 0.0314	< 0.45	< 0.109	< 0.0317	< 0.45	< 0.113	< 0.0316	< 0.110	< 0.0316
Combined Train Copper (Cu)	< 3.8	< 0.921	< 0.265	< 3.8	< 0.923	< 0.268	< 3.8	< 0.951	< 0.267	< 0.932	< 0.267
Combined Train Iron (Fe)	329	79.7	23.0	238	57.8	16.8	155	38.8	10.9	58.8	16.9
Combined Train Lead (Pb)	2.1	0.509	0.147	3.4	0.826	0.239	2.1	0.526	0.148	0.620	0.178
Combined Train Magnesium (Mg)	112	27.1	7.82	265	64.4	18.7	87	21.8	6.12	37.8	10.9
Combined Train Manganese (Mn)	11.4	2.76	0.796	5.2	1.26	0.366	6.8	1.70	0.478	1.91	0.547
Combined Train Molybdenum (Mo)	12.1	2.93	0.845	12.2	2.96	0.859	19.8	4.96	1.39	3.62	1.03
Combined Train Nickel (Ni)	4.6	1.11	0.321	4.6	1.12	0.324	4.5	1.13	0.316	1.12	0.321
Combined Train Phosphorus (P)	< 230	< 55.7	< 16.1	< 230	< 55.9	< 16.2	< 230	< 57.6	< 16.2	< 56.4	< 16.1
Combined Train Potassium (K)	< 300	< 72.7	< 21.0	< 300	< 72.9	< 21.1	< 300	< 75.1	< 21.1	< 73.5	< 21.1
Combined Train Selenium (Se)	< 5.0	< 1.21	< 0.349	< 5.0	< 1.21	< 0.352	< 5.0	< 1.25	< 0.351	< 1.23	< 0.351
Combined Train Silver (Ag)	< 0.60	< 0.145	< 0.0419	0.89	0.216	0.0627	< 0.60	< 0.150	< 0.0422	< 0.171	< 0.0489
Combined Train Strontium (Sr)	3.2	0.775	0.224	3.5	0.850	0.247	2.6	0.651	0.183	0.759	0.218
Combined Train Thallium (Tl)	< 0.60	< 0.145	< 0.0419	< 0.60	< 0.146	< 0.0423	< 0.60	< 0.150	< 0.0422	< 0.147	< 0.0421
Combined Train Tin (Sn)	34.3	8.31	2.40	45.0	10.9	3.17	44.5	11.1	3.13	10.1	2.90
Combined Train Titanium (Ti)	20.9	5.06	1.46	24.3	5.90	1.71	19.5	4.88	1.37	5.28	1.51
Combined Train Vanadium (V)	< 1.5	< 0.363	< 0.105	< 1.5	< 0.364	< 0.106	< 1.5	< 0.375	< 0.105	< 0.368	< 0.105
Combined Train Zinc (Zn)	< 25	< 6.06	< 1.75	< 25	< 6.07	< 1.76	< 25	< 6.26	< 1.76	< 6.13	< 1.75
Mercury	**(µg)**	**(µg/m³)**	**(mg/s)**	**(µg)**	**(µg/m³)**	**(mg/s)**	**(µg)**	**(µg/m³)**	**(mg/s)**	**(µg/m³)**	**(mg/s)**
Filterable Hg	0.556	-	-	0.693	-	-	0.561	-	-	-	-
Non-Filterable Hg	2.80	-	-	2.41	-	-	< 2.18	-	-	-	-
Total Hg	2.80	0.68	0.196	2.41	0.59	0.170	< 2.18	< 0.55	< 0.153	< 0.604	< 0.173

__Notes__ :
[1] Sample volume and volumetric flow rate based on dry referenced conditions (101.3 kPa and 25 °C)
'<' indicates that laboratory results were below the detection limit. The Method Detection Limit (RDL) was used to calculate the concentration and emission rate.
Concentration and Emission Rate has been reported to 3 cant figures.

TPM and Metals Sampling
Baseline Fuel: Metals, December

Facility: St. Mary's Cement				**Operator:** TFL	
City: Bowmanville				**Entered by:** TFL	
Source: Main Stack Baseline				**Checked by:** DO	
Reference Method: US EPA Method 5/29					
DATA INPUTS	**Symbol**	**Units**	**Test #1** TPM/Metals	**Test #2** TPM/Metals	**Test #3** TPM/Metals
Date			7-Dec-18	7-Dec-18	8-Dec-18
Start Time			8:24 AM	1:30 PM	7:56 AM
End Time			12:32 PM	5:40 PM	12:20 PM
Round Stack, Diameter (Inside)	d_s	in	216	216	216
Standard Temperature	T_s	°F	77	77	77
Standard Pressure	P_s	in.Hg	29.92	29.92	29.92
Nozzle Diameter	D_n	in	0.216	0.216	0.216
Average Stack Temperature	T_s	°F	235	235	243
Average Meter Temperature	T_m	°F	39	48	54
Barometric Pressure	P_{bar}	" Hg	29.9	29.9	29.9
Stack Static Pressure	P_g	" H_2O	-0.7	-0.7	-0.7
Average Delta H	dH	" H_2O	1.66	1.66	1.66
Average Velocity Head (root mean square)	dP_{rms}	" H_2O	0.778	0.786	0.741
Pitot Coefficient	C_p	-	0.838	0.838	0.838
	Pitot ID :		RWDI 7' #3		
Gas Sample Volume	V_m	ft³	136.87	138.96	136.44
DGM Calibration Factor	Y	-	0.998	0.998	0.998
	DGM ID:		Envirosol #2		
Total Sampling Time	min	minutes	240	240	240
Stack Gas Oxygen Concentration	O_2	%	13.6	14.1	14.2
Stack Gas Carbon Dioxide Concentration	CO_2	%	10.6	10.7	10.6
Impinger Gain	W_w	g	235.6	236	216.5

TPM and Metals Sampling

Facility:	St. Mary's Cement	**Operator:**	TFL
City:	Bowmanville	**Entered by:**	TFL
Source:	Main Stack Baseline	**Checked by:**	DO
Reference Method:	US EPA Method 5/29		

Emissions Calculations	**Symbol**	**Units**	**Test #1** TPM / Metals	**Test #2** TPM / Metals	**Test #3** TPM / Metals	**AVERAGE** TPM / Metals
Nozzle Area	A_n	ft²	2.54E-04	2.54E-04	2.54E-04	
Stack Area	A_s	ft²	254.47	254.47	254.47	
Average Stack Temperature	T_s	°R	695	695	703	698
Average DGM Temperature	T_m	°R	499	508	514	
Sample Volume at Reference Conditions	V_{mStd}	ft³	145.85	145.47	141.20	
	$\mathbf{V_{mmstd}}$	**m³**	**4.13**	**4.12**	**4.00**	
Vol. of Water Vapour	V_{wStd}	ft³	11.31	11.33	10.39	
Water Fraction	B_{ws}		7.2%	7.2%	6.9%	7.1%
Molecular Weight, dry	M_d	g/mole	30.35	30.38	30.37	30.37
Molecular Weight, wet	M_w	g/mole	29.46	29.49	29.52	29.49
Absolute Stack Pressure	P_s	in. Hg	29.85	29.85	29.85	29.85
Stack Gas Velocity	U_s	ft/s	55.99	56.27	54.91	55.72
	$\mathbf{U_{sm}}$	**m/s**	**17.07**	**17.15**	**16.74**	16.98
Actual Gas Flow Rate	Q_{act}	acf/min	854,874	859,143	838,407	850,808
Dry Gas Flow Rate (dry, ref)	Q_{ref}	dscf/min	611,196	614,571	595,317	607,028
	$\mathbf{Q_{mref}}$	**m³/min**	**17303**	**17399**	**16853**	17,185
	Qmref (Actual O_2)	**m³/s**	**288.38**	**289.98**	**280.89**	286.42
Isokinetic Rate	I	%	100	99	99	99

TPM and Metals Sampling

Facility:	St. Mary's Cement	**Operator:**	MP
City:	Bowmanville	**Entered by:**	TFL
Source:	Main Stack Baseline	**Checked by:**	DO
Reference Method:	US EPA Method 5/29		7-Dec-18
Run:	Metals Test #1		

Pt.	**Time** (min)	**Velocity Press.** ("H_2O)	**Orifice Press.** ("H_2O)	**Meter Volume** (°F)	**Stack Temp** (°F)	**Probe Temp** (°F)	**Box Temp** (°F)	**Imp Temp** (°F)	**Meter Temp** (°F)	**Flex Line Temp** (°F)	**Vac Pressure** ("Hg)	**Percentage Isokinetic** (%)	**Stack Velocity (ft/sec)**
Traverse 1- East													
Pre-Test Leak Check =		<0.02 at 14" Hg											
1	0	0.86	1.45	98.97	229	226	261	12	20	220	-1	102	58.71
	2.5	0.84	1.45	100.45	230	228	258	11	20	218	-1	100	58.07
	5	0.85	1.45	101.89	229	230	260	12	22	221	-1	100	58.37
2	7.5	0.84	1.45	103.34	230	232	259	12	23	222	-1	100	58.07
	10	0.86	1.45	104.79	229	231	258	12	24	224	-1	98	58.71
	12.5	0.85	1.45	106.23	230	231	260	12	25	224	-1	100	58.41
3	15	0.85	1.45	107.69	229	230	260	12	26	224	-1	101	58.37
	17.5	0.81	1.45	109.17	230	229	261	12	26	224	-1	99	57.02
	20	0.80	1.40	110.59	232	230	251	12	28	224	-1	101	56.75
4	22.5	0.80	1.40	112.03	231	225	258	12	29	224	-1	99	56.71
	25	0.80	1.40	113.45	232	227	259	12	30	224	-1	99	56.75
	27.5	0.76	1.40	114.87	232	228	260	13	31	224	-1	103	55.31
5	30	0.76	1.35	116.31	232	225	261	12	31	223	-1	101	55.31
	32.5	0.78	1.35	117.72	232	226	261	12	32	224	-1	99	56.04
	35	0.73	1.35	119.13	231	227	260	13	32	224	-1	104	54.17
6	37.5	0.75	1.30	120.56	230	228	260	13	32	223	-1	100	54.87
	40	0.74	1.30	121.96	231	230	258	13	33	223	-1	100	54.54
	42.5	0.75	1.30	123.34	230	231	261	13	33	223	-1	100	54.87
7	45	0.70	1.30	124.74	230	230	260	13	33	223	-1	105	53.01
	47.5	0.70	1.25	126.16	232	230	261	13	34	223	-1	100	53.09
	50	0.70	1.20	127.51	231	229	262	13	34	224	-1	102	53.05
8	52.5	0.68	1.20	128.89	232	227	259	13	35	224	-1	100	52.32
	55	0.70	1.20	130.23	232	229	260	13	35	224	-1	100	53.09
	57.5	0.69	1.20	131.59	232	231	262	13	36	224	-1	102	52.71
	60			132.96									
1	0	0.72	1.25	132.96	232	231	258	13	36	224	-1	100	53.84
	2.5	0.70	1.25	134.34	231	229	257	13	36	224	-1	101	53.05
	5	0.72	1.25	135.71	232	229	260	13	37	224	-1	100	53.84
2	7.5	0.71	1.25	137.09	233	227	258	13	37	224	-1	102	53.50
	10	0.69	1.25	138.49	232	229	260	13	37	224	-1	100	52.71
	12.5	0.72	1.25	139.84	233	228	259	13	37	224	-1	99	53.88
3	15	0.73	1.25	141.21	233	226	262	14	37	224	-1	99	54.25
	17.5	0.72	1.25	142.59	232	225	259	14	37	224	-1	99	53.84
	20	0.70	1.25	143.96	232	229	260	14	37	224	-1	102	53.09
4	22.5	0.71	1.25	145.35	231	231	259	14	38	224	-1	101	53.43
	25	0.72	1.25	146.73	232	233	260	14	38	224	-1	100	53.84
	27.5	0.68	1.25	148.11	233	229	262	14	38	224	-1	101	52.36
5	30	0.69	1.25	149.47	233	227	258	14	38	224	-1	101	52.74
	32.5	0.66	1.25	150.84	232	226	261	14	38	224	-1	103	51.55
	35	0.71	1.25	152.20	232	226	261	14	38	224	-1	101	53.46
6	37.5	0.72	1.25	153.58	234	227	260	14	39	225	-1	98	53.92
	40	0.73	1.25	154.94	233	226	259	14	39	225	-1	98	54.25
	42.5	0.80	1.30	156.30	234	226	259	14	39	227	-1	95	56.83
7	45	0.85	1.30	157.69	234	226	260	14	39	227	-1	94	58.58
	47.5	0.85	1.35	159.10	233	225	261	14	39	227	-1	97	58.54
	50	0.82	1.30	160.56	233	225	260	14	39	227	-1	95	57.50
8	52.5	0.85	1.35	161.96	233	226	260	14	38	227	-1	94	58.54
	55	0.85	1.40	163.37	234	226	260	14	38	227	-1	95	58.58
	57.5	0.85	1.50	164.80	234	226	260	14	38	227	-1	95	58.58
	60			166.22									
1	0	0.93	1.55	166.22	234	246	260	14	35	216	-1	98	61.28
	2.5	0.95	1.55	167.74	233	256	259	17	35	224	-1	98	61.89
	5	0.93	1.55	169.29	234	257	260	17	37	225	-1	99	61.28
2	7.5	0.94	1.55	170.83	236	259	260	17	37	226	-1	96	61.69
	10	0.93	1.55	172.34	236	259	259	19	37	227	-1	96	61.37
	12.5	0.95	1.60	173.84	236	259	261	19	37	227	-1	98	62.02
3	15	0.90	1.55	175.39	240	260	262	21	38	229	-1	100	60.54
	17.5	0.88	1.55	176.92	238	260	260	22	39	230	-1	100	59.78
	20	0.86	1.55	178.44	239	259	260	23	39	230	-1	101	59.14
4	22.5	0.85	1.55	179.96	239	261	261	24	40	232	-1	102	58.79
	25	0.84	1.55	181.49	238	261	260	25	40	232	-1	100	58.40
	27.5	0.78	1.55	182.98	238	261	260	25	41	233	-1	106	56.28
5	30	0.78	1.50	184.50	237	258	260	26	42	235	-1	103	56.24
	32.5	0.78	1.45	185.99	238	262	259	27	43	235	-1	102	56.28
	35	0.78	1.45	187.47	239	260	260	27	43	235	-1	103	56.32
6	37.5	0.80	1.45	188.95	239	259	260	29	44	235	-1	100	57.04
	40	0.74	1.40	190.42	239	259	261	29	44	235	-1	102	54.86
	42.5	0.75	1.40	191.86	239	260	260	29	45	235	-1	102	55.23
7	45	0.64	1.30	193.31	239	261	261	29	45	235	-1	107	51.02
	47.5	0.65	1.25	194.72	239	261	261	30	45	236	-1	100	51.41
	50	0.63	1.20	196.04	238	258	258	30	45	236	-1	109	50.58
8	52.5	0.65	1.20	197.46	238	260	260	31	45	237	-1	102	51.38
	55	0.64	1.10	198.81	239	260	260	31	46	237	-1	100	51.02
	57.5	0.65	1.10	200.12	239	259	259	32	46	237	-1	100	51.41
	60			201.45									
1	0	0.66	1.10	201.45	239	260	260	32	46	237	-1	98	51.81
	2.5	0.64	1.10	202.76	240	261	260	33	47	237	-1	101	51.05
	5	0.65	1.10	204.09	239	260	260	34	47	237	-1	98	51.41
2	7.5	0.65	1.10	205.39	240	259	259	34	47	237	-1	99	51.45
	10	0.65	1.10	206.70	241	258	259	34	48	238	-1	100	51.49
	12.5	0.65	1.10	208.03	239	261	259	33	48	238	-1	98	51.41
3	15	0.65	1.10	209.34	239	255	259	33	48	239	-1	100	51.41
	17.5	0.65	1.10	210.67	239	260	260	33	49	240	-1	98	51.41
	20	0.64	1.10	211.98	241	258	260	32	49	240	-1	101	51.09
4	22.5	0.74	1.15	213.32	241	259	260	31	50	239	-1	96	54.94
	25	0.75	1.25	214.69	239	260	259	32	51	239	-1	95	55.23
	27.5	0.75	1.25	216.05	240	260	261	33	51	240	-1	96	55.27
5	30	0.78	1.35	217.43	243	261	261	32	51	239	-1	97	56.48
	32.5	0.86	1.45	218.85	242	259	260	31	52	238	-1	97	59.27
	35	0.90	1.50	220.34	241	259	259	30	52	238	-1	98	60.58
6	37.5	0.91	1.50	221.88	240	260	260	31	52	239	-1	96	60.88
	40	0.89	1.50	223.41	241	257	259	31	52	239	-1	98	60.25
	42.5	0.92	1.50	224.94	240	249	259	31	52	238	-1	96	61.21
7	45	0.93	1.55	226.47	241	261	260	31	53	239	-1	96	61.59
	47.5	0.94	1.55	228.01	241	261	261	30	53	239	-1	97	61.92
	50	0.92	1.55	229.57	242	244	256	29	53	239	-1	96	61.30
8	52.5	0.93	1.60	231.10	243	255	264	28	53	238	-1	99	61.67
	55	0.94	1.60	232.69	243	251	257	28	53	238	-1	97	62.00
	57.5	0.93	1.60	234.26	244	258	201	29	53	238		99	61.72
	60			235.84									
Post-test Leak Check =		<0.02 at 10" Hg											
	Average	0.78	1.349	136.87	235	243	259	21	39	230		100	55.99

TPM and Metals Sampling

Facility: St. Mary's Cement
City: Bowmanville
Source: Main Stack Baseline
Reference Method: US EPA Method 5/29
Run: Metals Test #2

Operator: JDG
Entered by: TFL
Checked by: DO
7-Dec-18

Pt.	Time (min)	Velocity Press. ("H_2O)	Orifice Press. ("H_2O)	Meter Volume (^oF)	Stack Temp (^oF)	Probe Temp (^oF)	Box Temp (^oF)	Imp Temp (^oF)	Meter Temp (^oF)	Flex Line Temp (^oF)	Vac Pressure ("Hg)	Percentage Isokinetic (%)	Stack Velocity (ft/sec)
Traverse 1- South													
Pre-Test Leak Check =		<0.01 at 8" Hg											
1	0	0.87	1.45	236.41	235	226	259	16	42	222	-1	98	59.28
	2.5	0.86	1.45	237.91	234	227	261	20	42	221	-1	98	58.90
	5	0.86	1.45	239.39	235	230	261	21	41	221	-1	99	58.94
2	7.5	0.85	1.45	240.89	235	234	260	22	42	221	-1	99	58.60
	10	0.88	1.50	242.38	235	234	261	21	43	221	-1	99	59.62
	12.5	0.87	1.50	243.90	236	227	259	21	43	222	-1	98	59.32
3	15	0.79	1.40	245.40	234	228	261	21	44	222	-1	101	56.45
	17.5	0.78	1.40	246.88	233	232	256	22	44	222	-1	102	56.05
	20	0.79	1.40	248.36	234	232	261	22	44	222	-1	99	56.45
4	22.5	0.79	1.40	249.81	234	228	260	21	45	222	-1	101	56.45
	25	0.79	1.40	251.29	235	229	258	21	45	222	-1	100	56.49
	27.5	0.81	1.40	252.75	233	227	261	21	45	222	-1	99	57.12
5	30	0.77	1.40	254.22	234	231	259	21	46	221	-1	103	55.73
	32.5	0.74	1.35	255.71	235	229	259	21	46	222	-1	101	54.67
	35	0.76	1.35	257.14	235	226	262	21	46	222	-1	101	55.41
6	37.5	0.68	1.25	258.59	235	238	263	21	47	222	-1	102	52.41
	40	0.70	1.25	259.98	235	243	262	21	47	217	-1	101	53.18
	42.5	0.69	1.25	261.37	235	241	260	21	47	219	-1	104	52.76
7	45	0.64	1.20	262.80	234	236	260	21	47	223	-1	103	50.81
	47.5	0.64	1.15	264.16	234	251	262	22	47	225	-1	102	50.81
	50	0.64	1.15	265.51	234	251	262	22	47	225	-1	100	50.81
8	52.5	0.66	1.15	266.84	234	257	258	22	48	226	-1	99	51.60
	55	0.64	1.15	268.18	234	251	261	21	48	226	-1	99	50.81
	57.5	0.65	1.15	269.49	235	252	259	21	48	226	-1	100	51.24
	60			270.83									
1	0	0.65	1.15	270.83	235	248	259	22	49	226	-1	99	51.24
	2.5	0.64	1.15	272.15	235	240	260	22	49	226	-1	99	50.85
	5	0.64	1.15	273.47	234	234	252	21	49	226	-1	100	50.81
2	7.5	0.68	1.20	274.80	234	230	260	21	49	225	-1	99	52.37
	10	0.65	1.20	276.16	234	232	260	21	49	225	-1	100	51.20
	12.5	0.63	1.20	277.50	235	236	261	21	49	225	-1	105	50.45
3	15	0.72	1.20	278.88	235	233	259	21	49	222	-1	97	53.93
	17.5	0.72	1.20	280.24	235	229	260	21	49	221	-1	97	53.93
	20	0.73	1.20	281.60	236	231	260	21	49	221	-1	97	54.34
4	22.5	0.76	1.35	282.98	236	237	262	21	49	221	-1	100	55.45
	25	0.76	1.35	284.42	236	243	259	21	49	221	-1	100	55.45
	27.5	0.77	1.35	285.86	235	248	260	21	49	221	-1	100	55.77
5	30	0.77	1.35	287.32	236	248	260	22	50	220	-1	98	55.81
	32.5	0.77	1.35	288.75	235	252	258	22	50	220	-1	100	55.77
	35	0.76	1.35	290.21	236	251	261	22	50	220	-1	100	55.45
6	37.5	0.78	1.35	291.66	236	253	259	22	50	220	-1	98	56.17
	40	0.82	1.40	293.09	236	256	260	22	51	220	-1	98	57.59
	42.5	0.80	1.40	294.57	235	251	260	23	51	220	-1	99	56.85
7	45	0.81	1.40	296.04	235	246	259	24	51	220	-1	97	57.20
	47.5	0.81	1.40	297.50	236	246	258	24	52	222	-1	98	57.24
	50	0.82	1.45	298.97	236	245	261	24	52	220	-1	101	57.59
8	52.5	0.84	1.45	300.49	236	245	261	24	52	220	-1	97	58.29
	55	0.83	1.45	301.97	236	253	260	23	52	221	-1	97	57.94
	57.5	0.82	1.45	303.45	234	248	260	24	52	220	-1	99	57.51
	60			304.95									
1	0	0.88	1.50	304.95	237	259	259	20	50	225	-1	98	59.71
	2.5	0.86	1.50	306.47	236	259	259	23	52	225	-1	97	58.98
	5	0.86	1.55	307.97	237	258	259	24	52	225	-1	100	59.02
2	7.5	0.86	1.55	309.51	236	259	259	26	52	225	-1	101	58.98
	10	0.88	1.55	311.07	235	258	259	26	52	225	-1	98	59.62
	12.5	0.89	1.55	312.60	236	258	259	27	52	225	-1	99	60.00
3	15	0.85	1.50	314.16	236	261	260	27	52	225	-1	98	58.64
	17.5	0.85	1.50	315.67	236	259	260	28	52	225	-1	99	58.64
	20	0.86	1.50	317.19	235	259	259	28	51	225	-1	97	58.94
4	22.5	0.80	1.40	318.69	235	258	260	29	51	224	-1	99	56.85
	25	0.79	1.40	320.16	236	258	260	29	51	223	-1	98	56.53
	27.5	0.80	1.40	321.61	236	259	260	30	51	223	-1	32	56.89
5	30	0.75	1.35	322.09	236	261	260	30	51	223	-1	101	55.08
	32.5	0.76	1.35	323.54	236	261	261	30	51	224	-1	105	55.45
	35	0.75	1.30	325.06	236	258	261	30	51	224	-1	99	55.08
6	37.5	0.76	1.30	326.49	236	258	261	30	51	224	-1	101	55.45
	40	0.72	1.30	327.96	236	258	261	30	51	224	-1	95	53.97
	42.5	0.75	1.35	329.30	234	260	261	30	50	224	-1	100	55.00
7	45	0.77	1.35	330.74	235	259	261	30	50	223	-1	99	55.77
	47.5	0.77	1.35	332.19	235	261	261	30	50	223	-1	102	55.77
	50	0.80	1.40	333.67	235	262	260	31	50	223	-1	94	56.85
8	52.5	0.80	1.40	335.07	235	259	260	31	50	222	-1	98	56.85
	55	0.75	1.35	336.52	236	260	261	31	50	221	-1	103	55.08
	57.5	0.77	1.35	338.00	235	258	260	32	50	221	-1	97	55.77
	60			339.42									
1	0	0.77	1.35	339.42	234	259	260	31	50	221	-1	96	55.73
	2.5	0.75	1.35	340.82	234	260	258	31	49	220	-1	98	55.00
	5	0.78	1.40	342.23	234	261	261	32	49	220	-1	100	56.09
2	7.5	0.76	1.40	343.70	235	260	261	32	49	220	-1	100	55.41
	10	0.76	1.40	345.15	233	259	261	32	49	220	-1	100	55.33
	12.5	0.80	1.40	346.60	234	260	261	32	48	220	-1	100	56.81
3	15	0.80	1.40	348.08	235	260	260	33	48	214	-1	97	56.85
	17.5	0.80	1.40	349.52	234	261	260	32	48	215	-1	104	56.81
	20	0.83	1.40	351.06	234	260	260	33	48	216	-1	95	57.86
4	22.5	0.84	1.45	352.49	234	262	260	33	48	214	-1	97	58.21
	25	0.84	1.55	353.96	233	262	260	33	48	215	-1	99	58.17
	27.5	0.80	1.50	355.46	233	261	260	33	48	216	-1	101	56.76
5	30	0.80	1.50	356.96	234	262	261	33	49	218	-1	100	56.81
	32.5	0.82	1.50	358.45	234	260	260	33	49	219	-1	100	57.51
	35	0.82	1.50	359.95	235	259	260	34	49	220	-1	100	57.55
6	37.5	0.88	1.60	361.45	234	257	260	34	49	222	-1	98	59.58
	40	0.86	1.60	362.98	234	258	260	34	49	222	-1	101	58.90
	42.5	0.88	1.60	364.53	235	259	260	34	49	222	-1	100	59.62
7	45	0.89	1.60	366.08	235	261	259	34	49	223	-1	99	59.96
	47.5	0.90	1.60	367.62	234	263	261	34	49	223	-1	100	60.25
	50	0.92	1.60	369.19	234	261	261	34	48	223	-1	97	60.92
8	52.5	0.89	1.60	370.73	234	262	259	35	48	223	-1	100	59.92
	55	0.90	1.60	372.29	235	261	260	35	48	223	-1	98	60.29
	57.5	0.88	1.60	373.83	235	259	261	35	48	223		99	59.62
	60			375.37									
Post-test Leak Check =		<0.01 at 10" Hg											
	Average	0.79	1.390	138.96	235	250	260	26	48	222		99	56.27

TPM and Metals Sampling

Facility: St. Mary's Cement		**Operator:** JDG	
City: Bowmanville		**Entered by:** TFL	
Source: Main Stack Baseline		**Checked by:** DO	
Reference Method: US EPA Method 5/29			8-Dec-18
Run: Metals Test #3			

Pt.	Time (min)	Velocity Press. ("H_2O)	Orifice Press. ("H_2O)	Meter Volume (°F)	Stack Temp (°F)	Probe Temp (°F)	Box Temp (°F)	Imp Temp (°F)	Meter Temp (°F)	Flex Line Temp (°F)	Vac Pressure ("Hg)	Percentage Isokinetic (%)	Stack Velocity (ft/sec)
Traverse 1- South													
Pre-Test Leak Check =		<0.02 at 12" Hg											
1	0	0.79	1.25	375.56	238	255	261	17	29	212	-1	96	56.58
	2.5	0.79	1.25	376.92	240	259	259	23	32	214	-1	95	56.66
	5	0.79	1.30	378.28	239	257	260	24	32	215	-1	98	56.62
2	7.5	0.80	1.30	379.67	240	259	259	24	33	216	-1	96	57.02
	10	0.78	1.30	381.05	240	257	261	24	33	217	-1	98	56.30
	12.5	0.80	1.35	382.44	240	262	260	25	35	218	-1	98	57.02
3	15	0.76	1.30	383.85	240	260	261	30	35	219	-1	99	55.57
	17.5	0.75	1.30	385.24	240	260	259	30	36	219	-1	98	55.21
	20	0.75	1.30	386.61	240	258	262	25	37	219	-1	99	55.21
4	22.5	0.74	1.30	388.00	241	260	261	24	38	219	-1	98	54.88
	25	0.74	1.30	389.37	239	256	258	24	38	219	-1	100	54.80
	27.5	0.74	1.30	390.76	239	250	261	24	38	219	-1	101	54.80
5	30	0.68	1.25	392.17	241	262	261	23	40	217	-1	102	52.60
	32.5	0.70	1.25	393.54	239	260	260	23	41	217	-1	100	53.30
	35	0.70	1.25	394.90	241	259	260	23	41	217	-1	103	53.37
6	37.5	0.70	1.20	396.30	240	259	260	23	43	218	-1	101	53.33
	40	0.65	1.15	397.68	239	261	259	23	43	220	-1	100	51.36
	42.5	0.64	1.15	399.00	241	258	259	24	44	221	-1	102	51.03
7	45	0.65	1.15	400.34	240	256	261	24	45	221	-1	102	51.39
	47.5	0.61	1.10	401.69	240	261	259	24	46	227	-1	101	49.79
	50	0.62	1.10	402.99	241	264	261	25	47	227	-1	102	50.23
8	52.5	0.63	1.10	404.31	241	257	260	26	48	229	-1	101	50.63
	55	0.62	1.10	405.64	242	260	261	25	49	229	-1	102	50.27
	57.5	0.59	1.00	406.97	242	264	259	26	49	229	-1	99	49.04
	60			408.23									
1	0	0.60	1.00	408.23	242	263	259	26	50	229	-1	96	49.45
	2.5	0.58	1.00	409.46	243	259	259	28	50	230	-1	103	48.65
	5	0.65	1.10	410.76	243	260	259	27	51	230	-1	99	51.50
2	7.5	0.62	1.10	412.09	242	257	260	28	51	230	-1	102	50.27
	10	0.59	1.00	413.43	241	257	260	28	53	230	-1	97	49.00
	12.5	0.58	1.00	414.68	241	266	260	28	53	230	-1	96	48.58
3	15	0.65	1.10	415.90	240	259	261	29	53	230	-1	97	51.39
	17.5	0.64	1.10	417.21	242	258	260	30	54	230	-1	104	51.07
	20	0.64	1.10	418.60	242	259	259	30	55	230	-1	101	51.07
4	22.5	0.63	1.10	419.95	245	257	260	30	55	231	-1	94	50.78
	25	0.74	1.30	421.20	243	259	260	31	56	214	-1	96	54.95
	27.5	0.72	1.30	422.59	243	262	260	32	57	219	-1	101	54.21
5	30	0.73	1.30	424.03	243	257	260	32	58	222	-1	99	54.58
	32.5	0.75	1.30	425.46	244	260	260	32	58	222	-1	99	55.36
	35	0.72	1.30	426.90	243	259	260	33	59	223	-1	101	54.21
6	37.5	0.74	1.30	428.34	244	258	261	34	60	224	-1	99	54.99
	40	0.75	1.30	429.78	243	261	260	34	60	224	-1	98	55.32
	42.5	0.76	1.30	431.21	244	262	260	34	61	224	-1	98	55.73
7	45	0.79	1.35	432.66	246	262	260	34	62	225	-1	97	56.90
	47.5	0.80	1.35	434.12	244	260	260	35	62	225	-1	98	57.18
	50	0.81	1.35	435.60	245	258	261	35	63	225	-1	104	57.58
8	52.5	0.79	1.35	437.19	245	261	259	35	64	226	-1	93	56.86
	55	0.80	1.45	438.60	245	256	260	35	64	225	-1	98	57.22
	57.5	0.79	1.40	440.09	245	256	259	35	64	225	-1	96	56.86
	60			441.54			.						
1	0	0.89	1.50	441.54	246	234	258	27	63	195	-1	96	60.40
	2.5	0.86	1.50	443.07	245	233	260	29	62	194	-1	97	59.33
	5	0.87	1.55	444.59	245	244	262	28	63	194	-1	98	59.67
2	7.5	0.86	1.55	446.14	246	252	259	28	63	194	-1	100	59.37
	10	0.89	1.55	447.71	246	253	261	29	63	194	-1	96	60.40
	12.5	0.87	1.60	449.25	246	257	258	30	63	194	-1	100	59.71
3	15	0.85	1.55	450.84	245	251	259	30	64	196	-1	101	58.98
	17.5	0.86	1.55	452.42	245	251	259	30	64	196	-1	98	59.33
	20	0.88	1.60	453.97	245	258	261	30	64	196	-1	102	60.01
4	22.5	0.86	1.55	455.59	246	254	261	30	64	196	-1	98	59.37
	25	0.85	1.55	457.13	245	256	259	29	64	195	-1	100	58.98
	27.5	0.87	1.55	458.70	245	236	258	28	64	194	-1	97	59.67
5	30	0.74	1.30	460.23	246	247	259	28	64	194	-1	101	55.07
	32.5	0.74	1.30	461.70	245	248	259	28	64	219	-1	97	55.03
	35	0.72	1.30	463.12	244	238	261	27	64	223	-1	101	54.25
6	37.5	0.72	1.30	464.58	245	251	257	27	64	221	-1	98	54.28
	40	0.75	1.35	466.00	244	229	259	27	64	225	-1	99	55.36
	42.5	0.70	1.25	467.46	245	237	261	26	63	225	-1	101	53.52
7	45	0.70	1.25	468.89	245	217	257	26	63	225	-1	102	53.52
	47.5	0.70	1.25	470.34	244	224	266	26	63	226	-1	99	53.49
	50	0.69	1.25	471.74	245	219	266	26	63	226	-1	102	53.14
8	52.5	0.68	1.20	473.18	243	218	253	25	62	226	-1	99	52.68
	55	0.68	1.20	474.57	242	222	264	25	62	227	-1	99	52.64
	57.5	0.69	1.20	475.95	243	218	253	25	62	227	-1	98	53.07
	60			477.33									
1	0	0.66	1.20	477.33	242	225	262	25	61	225	-1	100	51.86
	2.5	0.68	1.20	478.71	242	230	262	25	60	228	-1	99	52.64
	5	0.66	1.20	480.09	243	239	262	26	60	228	-1	100	51.90
2	7.5	0.68	1.20	481.46	241	223	261	26	60	228	-1	99	52.60
	10	0.71	1.25	482.84	242	220	259	26	59	228	-1	98	53.79
	12.5	0.70	1.25	484.24	241	227	259	26	59	228	-1	99	53.37
3	15	0.74	1.25	485.64	241	230	261	26	58	229	-1	98	54.88
	17.5	0.73	1.25	487.06	242	238	259	26	58	228	-1	97	54.54
	20	0.72	1.25	488.46	241	253	260	27	57	229	-1	97	54.13
4	22.5	0.74	1.30	489.85	241	250	259	27	57	229	-1	98	54.88
	25	0.77	1.35	491.27	243	249	261	27	56	230	-1	97	56.06
	27.5	0.77	1.35	492.70	242	248	259	27	56	230	-1	98	56.02
5	30	0.75	1.35	494.14	244	239	259	28	56	230	-1	99	55.36
	32.5	0.76	1.35	495.58	245	254	261	27	56	230	-1	98	55.77
	35	0.78	1.40	497.01	244	246	258	28	57	230	-1	98	56.46
6	37.5	0.76	1.40	498.46	245	252	264	27	57	230	-1	101	55.77
	40	0.76	1.35	499.94	245	235	262	28	56	230	-1	132	55.77
	42.5	0.87	1.45	501.87	243	248	262	28	56	231	-1	64	59.59
7	45	0.83	1.40	502.87	245	250	261	28	56	230	-1	97	58.28
	47.5	0.85	1.45	504.35	244	259	260	29	57	231	-1	96	58.94
	50	0.86	1.50	505.84	245	260	259	29	57	231	-1	101	59.33
8	52.5	0.85	1.50	507.41	245	260	258	30	58	232	-1	98	58.98
	55	0.87	1.50	508.93	244	260	262	31	58	233	-1	99	59.63
	57.5	0.85	1.50	510.48	245	258	262	32	58	234	-1	98	58.98
	60			512.00									
Post-test Leak Check =		<0.01 at 12" Hg											
	Average	0.74	1.297	136.44	243	250	260	28	54	221		99	54.91

APPENDIX D

Sampling Results - Polycyclic Aromatic Hydrocarbons (PAH's)

Source: Main Stack Baseline

Test :	Test #1			Test #2			Test #3			AVERAGE RESULTS	
Sample Volume (Rm^3) [1] :	3.95			3.92			3.91				
Stack Flow Rate (Rm^3/s) [1] :	282.6			288.1			282.9			284.5	
	(µg)	(µg/m³)	(µg/s)	(µg)	(µg/m³)	(µg/s)	(µg)	(µg/m³)	(µg/s)	(µg/m³)	(µg/s)
1-Methylnaphthalene	322	81.6	23100	313	79.9	23000	304	77.8	22000	79.8	< 22700
1-Methylphenanthrene	0.96	0.2	68.8	1.02	0.3	75	0.66	0.2	47.8	0.224	< 64
2-Chloronaphthalene	4.08	1.0	292	7.32	1.9	538	4.86	1.2	352	1.38	< 394
2-Methylanthracene	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
2-Methylnaphthalene	448	114.0	32100	446	114.0	32800	418	107.0	30300	111.0	< 31700
3-Methylcholanthrene	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
7,12-Dimethylbenzo(a)anthracene	< 1.2	0.3	85.9	< 1.2	0.3	88.2	< 1.2	0.3	86.9	< 0.306	< 87
9,10-Dimethylanthracene	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
9-Methylphenanthrene	1.98	0.5	142	2.22	0.6	163	1.86	0.5	135	0.515	< 147
Acenaphthene	4.44	1.1	318	8.70	2.2	640	5.46	1.4	395	1.58	< 451
Acenaphthylene	6.30	1.6	451	9.84	2.5	723	7.08	1.8	513	1.97	< 562
Anthracene	0.66	0.2	47.3	0.60	0.2	44.1	0.48	0.1	34.7	0.148	< 42
Benzo(a)anthracene	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
Benzo(a)fluorene	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
Benzo(a)pyrene	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
Benzo(b)fluoranthene	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
Benzo(b)fluorene	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
Benzo(e)pyrene	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
Benzo(g,h,i)perylene	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
Benzo(k)fluoranthene	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
Biphenyl	138	35.0	9880	139	35.5	10200	137	35.1	9920	35.2	< 10000
Chrysene	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
Coronene	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
Dibenzo(a,c)anthracene	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
Fluoranthene	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
Fluorene	2.46	0.6	176	3.96	1.0	291	2.46	0.6	178	0.755	< 215
Indeno(1,2,3-cd)pyrene	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
m-Terphenyl	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
Naphthalene	788	200.0	56400	739	189.0	54300	716	183.0	51800	191.0	< 54200
o-Terphenyl	0.36	0.1	25.8	0.36	0.1	26.5	0.30	0.1	21.7	0.0866	< 25
Perylene	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
Phenanthrene	12.0	3.0	859	14.8	3.8	1090	11.2	2.9	811	3.23	< 919
Picene	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
p-Terphenyl	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
Pyrene	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
Tetralin	206	52.2	14800	191	48.7	14000	188	48.1	13600	49.7	< 14100
Triphenylene	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
1,2,3,4-Tetrachlorobenzene	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
1,2,3,5+1,2,4,5-Tetrachlorobenzene	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
1,2,3-Trichlorobenzene	0.71	0.2	50.8	3.69	0.9	271	0.96	0.2	69.5	0.456	< 131
1,2,4-Trichlorobenzene	1.45	0.4	104	1.57	0.4	115	1.70	0.4	123	0.401	< 114
1,2-Dichlorobenzene	9.30	2.4	666	5.32	1.4	391	6.07	1.6	439	1.76	< 499
1,3,5-Trichlorobenzene	0.39	0.1	27.9	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0841	< 24
1,3-Dichlorobenzene	2.11	0.5	151	2.35	0.6	173	1.91	0.5	138	0.541	< 154
1,4-Dichlorobenzene	1.39	0.4	99.5	1.69	0.4	124	1.84	0.5	133	0.418	< 119
Hexachlorobenzene	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
Pentachlorobenzene	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
2,3,4,5-Tetrachlorophenol	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
2,3,4,6-Tetrachlorophenol	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
2,3,4-Trichlorophenol	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
2,3,5,6-Tetrachlorophenol	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
2,3,5-Trichlorophenol	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
2,3,6-Trichlorophenol	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
2,3-Dichlorophenol	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
2,4 + 2,5-Dichlorophenol	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
2,4,5-Trichlorophenol	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
2,4,6-Trichlorophenol	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
2,6-Dichlorophenol	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
2-Chlorophenol	7.83	2.0	561	7.67	2.0	564	6.05	1.6	438	1.83	< 521
3,4,5-Trichlorophenol	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
3,4-Dichlorophenol	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
3,5-Dichlorophenol	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22
3-Chlorophenol	1.51	0.4	108	1.13	0.3	83.1	0.74	0.2	53.6	0.287	< 82
4-Chlorophenol	1.86	0.5	133	1.54	0.4	113	1.45	0.4	105	0.412	< 117
Pentachlorophenol	< 0.30	0.1	21.5	< 0.30	0.1	22.1	< 0.30	0.1	21.7	< 0.0765	< 22

Notes:

[1] Sample volume and volumetric flow rate based on dry referenced conditions (101.3kPa, and 25°C)

'<' indicates that laboratory results were below the detection limit. The detection limit was used to calculate the concentration and emission rate.

Concentration and Emission Rate has been reported to 3 significant figures.

Blank was not inlcuded in Lab Analysis

Sampling Results - Dioxins and Furans

Source: Main Stack Baseline

Test :	Test #1			Test #2			Test #3			Average Concentration	Average Concentration @25 °C and 11 % O_2	Reg 419 Toxic Equivalency Factors		
Sample Volume (m^3) [1] :	3.95			3.92			3.91					TEF	TEF Concentration	TEF Emission Rate
Stack Flow Rate (m^3/s) [1] :	282.6			288.1			282.9							
	(pg)	**(pg/m^3)**	**(pg/s)**	**(pg)**	**(pg/m^3)**	**(pg/s)**	**(pg)**	**(pg/m^3)**	**(pg/s)**	**(pg/m^3)**	**(pg/m^3)**		**(pg TEQ/m^3)**	**(pg/s)**
2,3,7,8-Tetra CDD *	< 13	3.29	931	< 17	4.34	1250	< 18	4.61	1300	4.1	6.96	1	7.0	1150
1,2,3,7,8-Penta CDD *	< 7.1	1.8	508	< 9.7	2.48	713	< 9.3	2.38	673	2.2	3.79	1	3.79	625
1,2,3,4,7,8-Hexa CDD *	< 6.5	1.7	466	< 6.5	1.66	478	< 7.0	1.79	507	1.7	2.90	0.1	0.29	47.9
1,2,3,6,7,8-Hexa CDD *	< 6.4	1.62	458	< 6.3	1.61	463	< 6.9	1.77	499	1.67	2.85	0.1	0.285	47
1,2,3,7,8,9-Hexa CDD *	< 6.0	1.52	430	< 5.9	1.51	434	< 6.4	1.64	463	1.55	2.65	0.1	0.265	43.7
1,2,3,4,6,7,8-Hepta CDD *	< 6.1	1.55	437	< 9.2	2.35	676	11.3	2.89	818	2.26	3.86	0.01	0.0386	6.37
1,2,3,4,6,7,8,9-Octa CDD *	26.1	6.61	1870	14.2	3.62	1040	10.5	2.69	760	4.31	7.36	0.0003	0.00221	0.364
2,3,7,8-Tetra CDF **	< 9.0	2.3	645	< 8.7	2.22	640	< 13	3.33	941	2.6	4.46	0.1	0.446	73.5
1,2,3,7,8-Penta CDF **	< 6.5	1.65	466	< 7.6	1.94	559	< 6.8	1.74	492	1.78	3.04	0.03	0.0911	15
2,3,4,7,8-Penta CDF **	< 6.5	1.7	466	< 7.6	1.94	559	< 6.9	1.77	499	1.8	3.04	0.3	0.911	150
1,2,3,4,7,8-Hexa CDF **	< 6.0	1.5	430	< 6.4	1.63	471	< 6.3	1.61	456	1.59	2.71	0.1	0.271	44.8
1,2,3,6,7,8-Hexa CDF **	4.3	1.09	308	< 6.3	1.61	463	4.8	1.23	347	1.31	2.24	0.1	0.224	36.9
2,3,4,6,7,8-Hexa CDF **	< 6.5	1.65	466	< 7.0	1.79	515	< 6.8	1.74	492	1.72	2.94	0.1	0.294	48.5
1,2,3,7,8,9-Hexa CDF **	< 7.5	1.9	537	4.8	1.22	353	< 7.8	2	565	1.71	2.92	0.1	0.292	48.2
1,2,3,4,6,7,8-Hepta CDF **	< 7.8	2.0	559	< 5.7	1.45	419	6.9	1.77	499	1.73	2.95	0.01	0.030	4.87
1,2,3,4,7,8,9-Hepta CDF **	< 8.0	2.03	573	< 7.4	1.89	544	< 7.3	1.87	528	1.93	3.29	0.01	0.0329	5.44
1,2,3,4,6,7,8,9-Octa CDF **	10.2	2.6	731	< 6.8	1.74	500	< 12.7	3.25	919	2.52	4.30	0.003	0.0129	2.13
33'44'-TetraCB-(77)	< 57	14.4	4080	< 73	18.6	5370	< 73	18.7	5280	17.3	29.53	0.0001	0.0029500	0.487
344'5-TetraCB-(81)	< 56	14.2	4010	< 72	18.4	5290	< 72	18.4	5210	17	29.02	0.0003	0.0087100	1.44
233'44'-PentaCB-(105)	220	55.8	15800	180	45.9	13200	69	17.7	4990	39.8	67.93	0.00003	0.0020400	0.336
2344'5-PentaCB-(114)	< 26	6.59	1860	< 56	14.3	4120	< 34	8.7	2460	9.86	16.83	0.00003	0.00050500	0.0833
23'44'5-PentaCB-(118)	460	117	32900	390	99.5	28700	180	46.1	13000	87.4	149.18	0.00003	0.0044800	0.739
23'44'5'-PentaCB-(123)	< 29	7.35	2080	< 62	15.8	4560	< 37	9.47	2680	10.9	18.61	0.00003	0.00055800	0.0921
33'44'5-PentaCB-(126)	< 25	6.34	1790	< 53	13.5	3900	< 31	7.93	2240	9.26	15.81	0.1	1.5800	261
HexaCB-(156)+(157)	91	23.1	6520	< 67	17.1	4930	< 63	16.1	4560	18.8	32.09	0.00003	0.00096300	0.159
23'44'55'-HexaCB-(167)	< 46	11.7	3290	< 63	16.1	4630	< 60	15.4	4340	14.4	24.58	0.00003	0.00073700	0.122
33'44'55'-HexaCB-(169)	< 49	12.4	3510	< 68	17.4	5000	< 64	16.4	4630	15.4	26.29	0.03	0.78900	130
233'44'55'-HeptaCB-(189)	< 46	11.7	3290	< 46	11.7	3380	< 120	30.7	8690	18	30.72	0.00003	0.00092200	0.152
										Total Toxic Equivalency →			16.6	2740

Notes :

[1] Sample volume and volumetric flow rate based on dry referenced conditions (101.3 kPa and 25°C)

'<' indicates that laboratory results were below the Estimated Detection Limit (EDL) This detection limit was used to calculate the concentration and emission rate.

Concentration and Emission Rate has been repo 3 significant figures.

*CDD = chlorodibenzo-*p*-dioxin

**CDF = chlorodibenzo-*p*-furan

***CB = chlorobenzene

Semi-Volatile Organic Compounds Sampling

St. Mary's

Facility:	St. Mary's			**Operator:**	ACS
City:	Bowmanville, ON			**Entered by:**	ACS
Source:	Main Stack Baseline			**Checked by:**	JDF
Reference Method:	Environment Canada 1/RM/2				

DATA INPUTS	**Symbol**	**Units**	**Test #1** SVOC	**Test #2** SVOC	**Test #3** SVOC
Date			30-Sep-18	1-Oct-18	2-Oct-18
Start Time			12:06 PM	8:57 AM	8:08 AM
End Time			4:25 PM	1:21 PM	12:40 PM
Round Stack, Diameter (Inside)	d_s	in	216	216	216
Standard Temperature	T_s	°F	77	77	77
Standard Pressure	P_s	" Hg	29.9	29.9	29.9
Nozzle Diameter	D_n	in	0.211	0.211	0.211
Average Stack Temperature	T_s	°F	267	257	256
Average Meter Temperature	T_m	°F	76	71	74
Barometric Pressure	P_{bar}	" Hg	30.3	29.8	29.6
Stack Static Pressure	P_g	" H_2O	-0.7	-0.7	-0.7
Average Delta H	dH	" H_2O	0.99	1.02	1.02
Average Velocity Head	dP_{rms}	" H_2O	0.78	0.81	0.80
Pitot Coefficient	C_p	-	0.838	0.838	0.838
		Pitot ID ->	RWDI 7' #3		
Gas Sample Volume	V_m	ft^3	137.93	137.93	139.49
DGM Calibration Factor	Y	-	0.993	0.993	0.993
		DGM ID ->	RWDI Console A		
Total Sampling Time	min	min	240	240	240
Stack Gas Oxygen Concentration	O_2	%	15.3	14.9	15.1
Stack Gas Carbon Dioxide Concentration	CO_2	%	11.4	11.9	12.2
Impinger Gain	W_w	g	243.8	243.8	250.8

Semi-Volatile Organic Compounds Sampling

Facility: St. Mary's	**Operator:** ACS
City: Bowmanville, ON	**Entered by:** ACS
Source: Main Stack Baseline	**Checked by:** JDF
Reference Method: Environment Canada 1/RM/2	

Emissions Calculations	**Symbol**	**Units**	**Test #1** SVOC	**Test #2** SVOC	**Test #3** SVOC	**AVERAGE**
Nozzle Area	A_n	ft²	0.00024	0.00024	0.00024	
Stack Area	A_s	ft²	254.47	254.47	254.47	
Average Stack Temperature	T_s	°R	727	717	716	720
Average DGM Temperature	T_m	°R	536	531	534	
Sample Volume at Reference Conditions	V_{mStd}	ft³	139.43	138.47	138.07	
	V_{mmstd}	**m³**	**3.95**	**3.92**	**3.91**	
Vol. of Water Vapour	V_{wStd}	ft³	11.7024	11.70192	12.0384	
Water Fraction	B_{ws}		7.7%	7.8%	8.0%	7.9%
Molecular Weight, dry	M_d	g/mole	30.54	30.60	30.66	30.60
Molecular Weight, wet	M_w	g/mole	29.57	29.62	29.64	29.61
Absolute Stack Pressure	P_s	" Hg	30.25	29.79	29.54	29.86
Stack Gas Velocity	U_s	ft/s	56.96	58.14	57.63	57.58
	U_{sm}	**m/s**	**17.36**	**17.72**	**17.57**	**17.55**
Actual Gas Flow Rate	Q_{act}	acf/min	869,692	887,677	879,943	879,104
Dry Gas Flow Rate (dry, ref)	Q_{ref}	dscf/min	598,946	610,575	599,482	603,001
	Q_{Rm}	m³/min	16956	17285	16971	17,071
	Qmref (Actual O_2)	**m³/s**	**282.60**	**288.09**	**282.86**	**284.5**
	Qmref (11% O_2)	**m³/sec**	**158.3**	**172.9**	**164.1**	**165.1**
Isokinetic Rate	I	%	102	99	101	100

Semi-Volatile Organic Compounds Sampling

Facility:	St. Mary's	**Operator:**	ACS
City:	Bowmanville, ON	**Entered by:**	WSC
Source:	Main Stack Baseline	**Checked by:**	JDF
Reference Method:	Environment Canada 1/RM/2	**Test Date:**	30-Sep-18
Run:	Test 1		

Point	Time (min)	Velocity Pressure (" H_2O)	Orifice Pressure (" H_2O)	Meter Volume (ft^3)	Stack Temp (^oF)	Probe Temp (^oF)	Box Temp (^oF)	Imp Temp (^oF)	Meter Temp (^oF)	XAD Trap (^oF)	Vacuum Pressure (" Hg)	Percentage Isokinetic (%)	Stack Velocity (ft/s)
Traverse 1- East													
Pre-Test Leak Check =		<0.02 at 10" Hg											
1	0	0.86	1.00	179.88	300	242	253	53	70	66	-	99	61.14
	2.5	0.96	1.10	181.30	294	242	247	47	71	51	-5	94	64.34
	5	1.00	1.20	182.74	290	243	249	47	70	37	-7	103	65.50
2	7.5	1.00	1.20	184.34	287	240	250	47	70	37	-7	93	65.36
	10	0.90	1.20	185.80	284	240	250	45	71	37	-8	108	61.89
	12.5	0.90	1.20	187.40	284	240	250	45	71	37	-8	108	61.89
3	15	0.92	1.20	189.00	282	240	250	45	71	37	-8	101	62.49
	17.5	0.90	1.20	190.52	281	240	251	45	71	37	-8	103	61.76
	20	0.89	1.20	192.05	281	240	251	45	74	37	-8	109	61.42
4	22.5	0.93	1.20	193.67	279	241	251	45	74	37	-8	106	62.70
	25	0.90	1.20	195.28	278	241	251	45	74	37	-8	105	61.64
	27.5	0.89	1.20	196.86	277	241	250	45	74	37	-8	106	61.25
5	30	0.88	1.10	198.45	276	240	248	44	74	37	-8	104	60.86
	32.5	0.88	1.10	200.00	275	241	249	44	74	37	-8	101	60.82
	35	0.86	1.10	201.51	272	241	250	44	74	37	-8	101	60.00
6	37.5	0.86	1.10	203.00	273	240	250	44	75	37	-8	102	60.05
	40	0.84	1.10	204.50	272	240	250	44	75	37	-8	103	59.30
	42.5	0.84	1.10	206.00	271	241	251	44	75	37	-8	103	59.26
7	45	0.80	1.00	207.51	271	241	250	44	75	37	-8	104	57.83
	47.5	0.80	1.00	208.99	270	239	250	44	75	38	-7	104	57.79
	50	0.82	1.00	210.48	270	239	250	44	75	38	-7	102	58.51
8	52.5	0.76	0.95	211.96	270	240	251	44	75	38	-7	104	56.33
	55	0.76	0.95	213.41	270	244	251	44	75	38	-7	101	56.33
	57.5	0.76	0.95	214.82	269	240	249	45	76	38	-7	101	56.29
	60	-	-	216.23	-	-	-	-	-	-	-	-	-
Traverse 2 - North													
1	0	0.82	1.00	216.23	270	240	250	45	74	38	-	104	58.51
	2.5	0.77	0.96	217.73	265	238	240	45	74	38	-7	102	56.51
	5	0.79	1.00	219.16	268	242	250	46	77	38	-7	101	57.35
2	7.5	0.80	1.00	220.60	268	238	250	45	77	38	-7	101	57.72
	10	0.80	1.00	222.05	267	238	250	45	77	39	-7	101	57.68
	12.5	0.76	0.95	223.50	266	235	249	45	77	39	-7	100	56.18
3	15	0.79	1.00	224.90	267	241	251	46	78	39	-7	100	57.31
	17.5	0.79	1.00	226.33	266	238	250	46	78	40	-7	101	57.27
	20	0.80	1.00	227.77	267	240	250	47	78	40	-7	99	57.68
4	22.5	0.86	1.10	229.20	267	239	250	47	78	40	-7	97	59.80
	25	0.86	1.10	230.65	266	239	250	47	78	40	-7	103	59.76
	27.5	0.86	1.10	232.19	266	240	250	47	78	40	-7	95	59.76
5	30	0.86	1.10	233.61	265	241	250	47	78	40	-7	92	59.72
	32.5	0.86	1.10	234.99	266	241	250	47	81	40	-7	103	59.76
	35	0.86	1.10	236.54	265	239	249	47	81	41	-7	97	59.72
6	37.5	0.86	1.10	238.00	264	240	250	47	79	41	-7	97	59.68
	40	0.86	1.10	239.45	265	238	240	48	79	41	-7	98	59.72
	42.5	0.86	1.10	240.92	263	239	249	48	79	41	-7	98	59.63
7	45	0.88	1.10	242.38	265	241	251	48	79	41	-7	96	60.41
	47.5	0.88	1.10	243.83	264	240	250	48	79	41	-7	97	60.37
	50	0.85	1.10	245.30	264	240	250	48	79	41	-7	98	59.33
8	52.5	0.87	1.10	246.75	263	239	250	48	79	44	-7	102	59.98
	55	0.90	1.20	248.28	263	240	250	48	79	45	-7	95	61.01
	57.5	0.87	1.20	249.73	263	240	250	48	79	45	-7	102	59.98
	60			251.27									
Traverse 3 - West													
1	0	0.82	1.05	251.27	263	239	247	52	77	49	-	104	58.23
	2.5	0.80	1.00	252.78	263	240	251	51	77	50	-7	102	57.52
	5	0.80	1.00	254.25	262	240	251	51	77	50	-7	101	57.48
2	7.5	0.80	1.00	255.71	262	241	249	52	81	52	-7	100	57.48
	10	0.78	1.00	257.16	264	240	251	52	78	52	-7	104	56.83
	12.5	0.76	1.00	258.64	263	241	251	52	78	52	-7	101	56.06
3	15	0.72	0.92	260.06	262	240	249	52	78	52	-7	106	54.53
	17.5	0.74	0.95	261.51	263	240	249	53	77	54	-7	102	55.32
	20	0.74	0.95	262.92	264	239	254	53	77	54	-7	103	55.36
4	22.5	0.74	0.95	264.35	264	239	250	53	77	54	-7	106	55.36
	25	0.74	0.95	265.81	265	239	250	53	77	54	-7	101	55.39
	27.5	0.74	0.95	267.20	265	241	250	54	78	56	-7	103	55.39
5	30	0.72	0.97	268.62	264	240	250	54	78	58	-7	101	54.60
	32.5	0.70	0.88	270.00	264	241	246	54	78	58	-7	104	53.84
	35	0.72	0.88	271.40	266	239	252	54	78	58	-7	98	54.68
6	37.5	0.70	0.88	272.74	265	241	252	51	78	42	-7	105	53.88
	40	0.66	0.83	274.15	265	240	249	51	78	42	-7	103	52.31
	42.5	0.66	0.83	275.50	264	240	248	51	78	42	-7	102	52.28
7	45	0.66	0.83	276.83	264	240	252	49	78	40	-7	99	52.28
	47.5	0.62	0.78	278.12	264	240	251	49	78	40	-6	106	50.67
	50	0.62	0.78	279.47	264	240	250	49	78	40	-6	105	50.67
8	52.5	0.62	0.78	280.80	262	240	250	49	78	40	-6	102	50.60
	55	0.64	0.81	282.10	262	240	252	48	78	41	-6	102	51.41
	57.5	0.66	0.83	283.42	262	239	248	48	78	41	-6	103	52.21
	60			284.77									
Traverse 4- East													
1	0	0.66	0.83	284.77	261	240	251	51	76	43	-	102	52.17
	2.5	0.62	0.78	286.10	261	240	245	50	76	44	-7	101	50.56
	5	0.62	0.78	287.38	260	232	245	48	76	44	-7	105	50.53
2	7.5	0.64	0.81	288.71	260	247	247	48	77	45	-7	100	51.34
	10	0.64	0.81	290.00	261	240	252	48	77	45	-7	106	51.37
	12.5	0.64	0.81	291.36	262	240	239	48	77	45	-7	105	51.41
3	15	0.65	0.90	292.71	262	252	239	48	77	45	-7	105	51.81
	17.5	0.69	0.90	294.07	262	241	250	49	77	47	-7	102	53.38
	20	0.68	0.90	295.43	262	240	250	49	77	47	-7	105	52.99
4	22.5	0.72	0.91	296.82	262	240	249	50	77	48	-7	101	54.53
	25	0.72	0.91	298.20	262	240	251	50	77	48	-7	103	54.53
	27.5	0.72	0.91	299.61	261	239	250	50	77	50	-7	102	54.49
5	30	0.72	0.91	301.00	263	239	249	50	77	50	-7	102	54.57
	32.5	0.72	0.91	302.40	263	240	250	50	77	50	-7	101	54.57
	35	0.73	0.91	303.78	263	241	250	50	77	50	-7	100	54.94
6	37.5	0.73	0.92	305.16	263	239	241	51	77	52	-7	101	54.94
	40	0.75	0.95	306.55	263	240	250	51	77	52	-7	104	55.69
	42.5	0.75	0.95	308.00	262	240	249	52	77	53	-7	99	55.65
7	45	0.75	0.95	309.38	263	240	250	52	77	53	-7	100	55.69
	47.5	0.75	0.95	310.77	263	238	251	52	77	54	-7	104	55.69
	50	0.76	0.96	312.22	263	241	250	52	77	54	-7	98	56.06
8	52.5	0.76	0.96	313.60	264	240	248	52	77	54	-7	100	56.10
	55	0.75	0.95	315.00	263	230	239	52	77	54	-7	101	55.69
	57.5	0.75	0.95	316.41	262	241	242	51	77	55	-7	100	55.65
	60			317.81									
Post-Test Leak Check =		<0.02 at 12" Hg											
	Average	0.78	0.99	137.93	267.35	240.01	249.17	48.39	75.54	44.36	-7.09	101.63	56.96

Semi-Volatile Organic Compounds Sampling

Facility: St. Mary's
City: Bowmanville, ON
Source: Main Stack Baseline
Reference Method: Environment Canada 1/RM/2
Run: Test 2

Operator: ACS
Entered by: ACS
Checked by: JDF
Test Date: 1-Oct-18

Point	Time (min)	Velocity Pressure (" H_2O)	Orifice Pressure (" H_2O)	Meter Volume (ft^3)	Stack Temp (^oF)	Probe Temp (^oF)	Box Temp (^oF)	Imp Temp (^oF)	Meter Temp (^oF)	XAD Trap (^oF)	Vacuum Pressure (" Hg)	Percentage Isokinetic (%)	Stack Velocity (ft/s)
Traverse 1- East													
Pre-Test Leak Check =	<0.02 at 10" Hg												
1	0	0.87	1.10	363.87	255	240	249	45	52	41	-	104	60.05
	2.5	0.87	1.10	365.37	255	240	249	44	53	36	-5	97	60.05
	5	0.87	1.10	366.77	255	239	249	44	53	36	-5	97	60.05
2	7.5	0.88	1.10	368.17	254	240	241	42	55	36	-5	97	60.35
	10	0.87	1.10	369.59	255	239	250	42	55	36	-5	101	60.05
	12.5	0.87	1.10	371.06	255	238	246	41	56	36	-5	90	60.05
3	15	0.87	1.10	372.38	256	241	251	41	56	36	-5	105	60.09
	17.5	0.87	1.10	373.91	257	241	259	41	56	36	-5	105	60.13
	20	0.84	1.00	375.44	256	241	249	41	61	37	-5	103	59.05
4	22.5	0.90	1.10	376.93	257	239	250	41	62	37	-5	95	61.16
	25	0.90	1.10	378.36	257	241	251	41	62	37	-5	99	61.16
	27.5	0.90	1.10	379.84	257	239	248	41	63	38	-5	102	61.16
5	30	0.83	1.05	381.37	258	240	249	41	63	39	-5	96	58.78
	32.5	0.84	1.05	382.75	258	241	251	41	65	39	-5	100	59.13
	35	0.84	1.05	384.20	258	241	251	41	65	39	-5	98	59.13
6	37.5	0.84	1.05	385.62	257	240	250	41	65	39	-5	98	59.09
	40	0.84	1.05	387.04	258	240	250	41	65	39	-5	80	59.13
	42.5	0.82	1.05	388.21	259	240	250	41	66	38	-5	107	58.46
7	45	0.82	1.05	389.75	257	239	251	41	67	38	-5	111	58.38
	47.5	0.76	1.00	391.36	258	240	252	41	67	38	-5	101	56.24
	50	0.76	1.00	392.76	258	240	249	42	68	39	-5	100	56.24
8	52.5	0.76	1.00	394.15	258	239	249	42	68	39	-5	103	56.24
	55	0.76	1.00	395.58	259	240	250	42	68	39	-5	95	56.28
	57.5	0.76	1.00	396.90	258	240	250	42	68	39	-5	106	56.24
	60			398.37									
Traverse 2 - North													
1	0	0.78	1.00	398.37	260	240	250	44	66	40	-	103	57.06
	2.5	0.78	1.00	399.81	260	240	252	43	68	40	-5	102	57.06
	5	0.79	1.00	401.25	259	240	250	43	68	40	-5	108	57.38
2	7.5	0.79	1.00	402.78	259	239	248	42	69	40	-5	94	57.38
	10	0.80	1.00	404.12	259	241	250	42	69	40	-5	87	57.75
	12.5	0.80	1.00	405.37	258	240	250	42	69	40	-5	114	57.71
3	15	0.80	1.00	407.00	259	238	251	42	69	40	-5	101	57.75
	17.5	0.84	1.10	408.45	258	240	251	42	69	40	-5	99	59.13
	20	0.84	1.10	409.90	258	242	249	42	69	40	-5	97	59.13
4	22.5	0.84	1.10	411.33	258	240	250	42	69	40	-5	106	59.13
	25	0.86	1.10	412.88	258	240	249	42	71	41	-5	101	59.83
	27.5	0.88	1.10	414.38	259	239	250	42	71	41	-5	33	60.56
5	30	0.88	1.10	414.88	259	241	251	43	72	42	-5	100	60.56
	32.5	0.88	1.10	416.39	259	240	250	43	72	42	-5	161	60.56
	35	0.88	1.10	418.82	258	240	250	43	72	42	-5	95	60.52
6	37.5	0.88	1.10	420.25	258	239	250	45	72	42	-5	99	60.52
	40	0.88	1.10	421.75	259	240	250	45	72	42	-5	99	60.56
	42.5	0.89	1.10	423.24	257	240	250	45	72	42	-5	96	60.82
7	45	0.90	1.10	424.70	259	241	250	45	72	42	-5	95	61.25
	47.5	0.90	1.10	426.15	259	241	250	45	72	42	-5	98	61.25
	50	0.90	1.10	427.65	258	239	250	45	74	45	-6	97	61.21
8	52.5	0.90	1.10	429.13	258	241	250	45	74	45	-6	96	61.21
	55	0.90	1.10	430.60	259	241	251	45	74	45	-6	98	61.25
	57.5	0.90	1.10	432.10	258	239	251	45	74	45	-6	93	61.21
	60			433.53									
Traverse 3 - West													
1	0	0.85	1.10	433.53	258	242	248	53	71	40	-	97	59.48
	2.5	0.85	1.10	434.97	258	240	250	53	71	40	-6	98	59.48
	5	0.86	1.10	436.42	258	239	250	49	73	48	-6	96	59.83
2	7.5	0.82	1.00	437.85	258	240	251	49	73	48	-6	99	58.42
	10	0.83	1.00	439.30	257	241	251	49	73	48	-6	99	58.74
	12.5	0.84	1.00	440.75	258	240	250	51	73	52	-6	98	59.13
3	15	0.82	1.00	442.20	257	240	252	51	75	52	-6	98	58.38
	17.5	0.82	1.00	443.64	257	239	250	51	75	52	-6	100	58.38
	20	0.84	1.00	445.10	257	240	250	52	76	55	-6	97	59.09
4	22.5	0.82	1.00	446.55	257	242	250	52	76	55	-6	99	58.38
	25	0.82	1.00	448.00	256	239	250	53	77	57	-6	99	58.34
	27.5	0.82	1.00	449.46	256	240	250	53	77	57	-6	101	58.34
5	30	0.82	1.00	450.95	256	240	250	53	77	57	-6	98	58.34
	32.5	0.82	1.00	452.40	256	240	252	53	77	57	-6	105	58.34
	35	0.82	1.00	453.95	257	241	250	55	77	59	-6	98	58.38
6	37.5	0.76	1.00	455.40	256	239	251	56	77	60	-6	94	56.17
	40	0.76	1.00	456.74	256	239	251	56	77	60	-6	101	56.17
	42.5	0.76	1.00	458.17	258	239	250	56	77	60	-6	104	56.24
7	45	0.66	0.86	459.65	257	238	251	56	77	60	-6	102	52.38
	47.5	0.67	0.86	461.00	257	241	250	56	77	62	-6	99	52.77
	50	0.66	0.85	462.32	257	241	250	57	77	62	-6	104	52.38
8	52.5	0.75	0.97	463.70	257	240	250	57	77	62	-6	96	55.83
	55	0.75	0.97	465.05	257	240	250	57	77	60	-6	103	55.83
	57.5	0.75	0.97	466.50	256	240	250	56	77	47	-6	101	55.79
	60			467.92									
Traverse 4- South													
1	0	0.68	0.87	467.92	250	235	250	53	75	49	-	95	52.90
	2.5	0.68	0.87	469.20	257	240	250	53	75	46	-6	108	53.16
	5	0.68	0.87	470.64	257	240	250	53	75	46	-6	100	53.16
2	7.5	0.72	0.96	471.97	250	240	250	49	75	46	-6	101	54.44
	10	0.72	0.96	473.36	250	239	250	49	78	47	-6	98	54.44
	12.5	0.72	0.96	474.72	257	235	249	49	78	47	-6	107	54.71
3	15	0.72	0.96	476.20	257	235	249	49	78	47	-6	101	54.71
	17.5	0.72	0.96	477.60	257	232	250	49	78	47	-6	98	54.71
	20	0.72	0.96	478.96	257	242	250	49	78	47	-6	98	54.71
4	22.5	0.72	0.96	480.32	250	238	250	47	78	47	-6	99	54.44
	25	0.79	1.00	481.70	257	238	250	49	78	47	-6	100	57.30
	27.5	0.79	1.00	483.15	257	242	250	49	78	47	-6	100	57.30
5	30	0.81	1.00	484.60	257	240	249	49	78	47	-6	97	58.02
	32.5	0.81	1.00	486.02	257	238	250	49	78	47	-6	98	58.02
	35	0.82	1.00	487.45	258	240	250	49	78	47	-6	99	58.42
6	37.5	0.82	1.00	488.91	257	239	249	51	79	46	-6	98	58.38
	40	0.82	1.00	490.35	250	241	251	51	79	46	-6	96	58.10
	42.5	0.82	1.00	491.77	251	249	251	51	79	46	-6	97	58.14
7	45	0.84	1.00	493.21	252	249	251	51	79	46	-6	101	58.88
	47.5	0.84	1.00	494.72	253	245	251	51	79	46	-6	95	58.92
	50	0.84	1.00	496.15	257	249	251	51	79	46	-6	92	59.09
8	52.5	0.84	1.00	497.52	257	245	251	52	79	49	-6	96	59.09
	55	0.84	1.00	498.95	257	245	251	54	79	55	-6	96	59.09
	57.5	0.84	1.00	500.38	257	245	251	54	79	55	-6	95	59.09
	60			501.80									
Post-Test Leak Check =	<0.02 at 12" Hg												
	Average	0.81	1.02	137.93	256.84	240.21	250.08	47.26	71.17	45.35	-5.54	99.11	58.14

Semi-Volatile Organic Compounds Sampling

Facility:	St. Mary's	**Operator:**	ACS
City:	Bowmanville, ON	**Entered by:**	ACS
Source:	Main Stack Baseline	**Checked by:**	JDF
Reference Method:	Environment Canada 1/RM/2	**Test Date:**	2-Oct-18
Run:	Test 3		

Point	**Time** (min)	**Velocity Pressure** (" H_2O)	**Orifice Pressure** (" H_2O)	**Meter Volume** (ft^3)	**Stack Temp** (^oF)	**Probe Temp** (^oF)	**Box Temp** (^oF)	**Imp Temp** (^oF)	**Meter Temp** (^oF)	**XAD Trap** (^oF)	**Vacuum Pressure** (" Hg)	**Percentage Isokinetic** **(%)**	**Stack Velocity** (ft/sec)
Traverse 1- West													
Pre-test Leak Check =		<0.02 at 10" Hg											
1	0	0.88	0.90	502.25	254	238	248	45	57	40	-	85	60.58
	2.5	0.85	1.10	503.50	252	240	248	44	57	35	5	115	59.46
	5	0.87	1.12	505.16	253	242	251	44	57	36	5	102	60.20
2	7.5	0.92	1.20	506.66	253	240	249	43	58	35	5	100	61.90
	10	0.88	1.15	508.17	254	240	250	43	59	35	5	103	60.58
	12.5	0.86	1.15	509.70	252	241	251	43	60	35	5	101	59.81
3	15	0.83	1.07	511.18	253	241	251	43	61	36	5	103	58.80
	17.5	0.84	1.08	512.67	254	240	250	44	62	35	5	101	59.19
	20	0.85	1.12	514.13	253	239	250	43	62	35	5	102	59.50
4	22.5	0.84	1.10	515.62	255	239	250	43	64	36	5	102	59.23
	25	0.85	1.10	517.10	256	240	251	43	64	36	5	100	59.63
	27.5	0.84	1.10	518.56	255	238	249	44	65	36	5	100	59.23
5	30	0.83	1.10	520.02	256	239	250	43	65	36	5	105	58.92
	32.5	0.83	1.10	521.55	256	240	249	43	66	36	5	97	58.92
	35	0.83	1.10	522.96	257	242	250	43	67	37	5	100	58.96
6	37.5	0.82	1.05	524.42	256	239	249	43	67	37	5	101	58.56
	40	0.83	1.07	525.88	256	240	249	43	68	36	5	100	58.92
	42.5	0.82	1.05	527.34	256	240	250	43	69	36	5	101	58.56
7	45	0.83	1.07	528.80	256	240	250	42	69	37	5	101	58.92
	47.5	0.75	0.93	530.28	255	241	252	42	70	36	5	100	55.97
	50	0.73	0.93	531.67	255	239	249	42	70	34	5	101	55.22
8	52.5	0.74	0.99	533.06	255	239	249	42	71	36	5	104	55.59
	55	0.79	0.99	534.50	255	240	249	42	71	36	5	98	57.44
	57.5	0.77	0.97	535.91	254	240	251	42	72	36	5	101	56.67
	60			537.34									
Traverse 2- North													
1	0	0.85	1.12	537.24	254	241	250	48	69	41	-	107	59.54
	2.5	0.84	1.10	538.82	254	240	252	45	71	37	5	100	59.19
	5	0.84	1.10	540.29	254	240	255	44	71	38	5	99	59.19
2	7.5	0.8	1.10	541.76	255	240	248	44	71	38	6	105	57.80
	10	0.84	1.10	543.28	254	241	251	44	72	37	6	101	59.19
	12.5	0.83	1.05	544.77	256	241	251	44	71	38	6	100	58.92
3	15	0.8	1.00	546.24	255	239	250	44	73	38	6	99	57.80
	17.5	0.8	1.00	547.67	254	240	246	45	74	38	6	101	57.76
	20	0.78	0.99	549.13	257	240	249	45	74	38	6	101	57.16
4	22.5	0.78	0.99	550.57	254	239	251	46	75	38	6	100	57.04
	25	0.79	0.99	552.00	255	240	250	45	75	38	6	98	57.44
	27.5	0.77	0.99	553.42	255	240	250	45	75	38	6	101	56.71
5	30	0.78	1.00	554.86	255	239	250	45	76	38	6	100	57.08
	32.5	0.74	1.00	556.30	254	240	241	45	76	38	6	104	55.56
	35	0.78	1.00	557.75	255	240	248	45	76	38	6	101	57.08
6	37.5	0.78	0.99	559.20	254	240	247	45	76	38	6	106	57.04
	40	0.73	0.94	560.72	255	240	250	46	76	40	6	96	55.22
	42.5	0.73	0.94	562.05	256	240	250	46	77	41	6	102	55.26
7	45	0.65	0.82	563.47	256	239	249	48	78	41	6	102	52.14
	47.5	0.65	0.82	564.81	257	240	250	47	78	46	6	102	52.18
	50	0.67	0.82	566.15	256	240	249	47	78	46	6	99	52.94
8	52.5	0.65	0.80	567.47	257	241	250	48	79	48	6	99	52.18
	55	0.65	0.80	568.77	257	239	249	49	79	48	6	101	52.18
	57.5	0.65	0.80	570.10	254	240	249	49	79	48	6	98	52.07
	60			571.39									
Traverse 3- West													
1	0	0.81	1.04	571.40	256	240	248	53	76	54	-	101	58.21
	2.5	0.81	1.04	572.88	254	240	250	52	76	55	6	100	58.12
	5	0.85	1.10	574.35	256	238	250	52	76	54	6	99	59.63
2	7.5	0.85	1.10	575.84	254	240	248	52	77	55	6	99	59.54
	10	0.8	1.03	577.33	253	240	250	52	77	55	6	101	57.72
	12.5	0.83	1.05	578.80	254	240	249	53	77	58	6	99	58.84
3	15	0.85	1.05	580.27	255	240	249	53	77	56	6	98	59.58
	17.5	0.83	1.05	581.75	255	240	248	40	78	40	6	101	58.88
	20	0.83	1.05	583.25	254	240	251	40	78	38	6	101	58.84
4	22.5	0.83	1.05	584.75	254	240	250	48	79	38	6	99	58.84
	25	0.83	1.05	586.22	252	240	248	48	79	37	6	98	58.75
	27.5	0.83	1.05	587.69	253	240	248	47	79	37	6	98	58.80
5	30	0.78	1.00	589.15	255	242	250	47	79	37	6	102	57.08
	32.5	0.78	1.00	590.63	253	240	248	47	79	37	6	100	57.00
	35	0.78	1.00	592.08	250	240	248	47	79	37	6	99	56.88
6	37.5	0.7	0.90	593.52	253	240	245	47	79	37	6	87	54.00
	40	0.74	0.98	594.72	253	240	245	46	79	38	6	116	55.52
	42.5	0.74	0.98	596.35	253	241	250	46	79	37	6	101	55.52
7	45	0.74	0.96	597.78	257	241	250	46	79	37	6	102	55.67
	47.5	0.74	0.96	599.22	257	240	250	46	79	38	6	101	55.67
	50	0.74	0.96	600.64	256	240	250	46	80	38	6	101	55.63
8	52.5	0.74	0.96	602.07	257	240	250	46	79	38	6	101	55.67
	55	0.74	0.96	603.49	258	241	249	47	79	39	6	105	55.71
	57.5	0.74	0.96	604.96	258	240	248	48	79	40	6	98	55.71
	60			606.33									
Traverse 4 - South													
1	0	0.76	0.98	606.33	258	240	250	52	78	41	-	102	56.46
	2.5	0.76	0.98	607.78	258	241	249	49	78	41	6	103	56.46
	5	0.76	0.98	609.24	259	242	249	49	77	40	6	102	56.50
2	7.5	0.74	0.96	610.68	257	245	249	50	78	43	6	103	55.67
	10	0.74	0.96	612.13	258	243	251	49	79	43	6	101	55.71
	12.5	0.74	0.96	613.55	257	239	249	49	78	44	6	101	55.67
3	15	0.74	0.96	614.97	259	240	249	49	79	44	6	101	55.75
	17.5	0.76	0.98	616.39	259	239	250	49	79	45	6	101	56.50
	20	0.76	0.98	617.83	259	240	251	49	79	46	6	101	56.50
4	22.5	0.81	1.02	619.26	259	241	250	49	80	46	6	101	58.33
	25	0.81	1.02	620.74	259	243	251	50	80	51	6	100	58.33
	27.5	0.79	1.00	622.21	259	245	250	52	80	47	6	99	57.60
5	30	0.84	1.07	623.65	260	245	251	51	80	49	6	100	59.44
	32.5	0.84	1.07	625.14	260	248	251	52	81	51	6	99	59.44
	35	0.84	1.07	626.63	260	249	250	51	81	51	6	100	59.44
6	37.5	0.87	1.12	628.13	260	249	250	51	81	51	6	86	60.49
	40	0.87	1.12	629.44	260	245	251	52	82	50	6	112	60.49
	42.5	0.87	1.12	631.15	260	245	250	52	82	49	6	99	60.49
7	45	0.87	1.12	632.67	260	245	250	52	82	48	6	99	60.49
	47.5	0.85	1.04	634.18	261	245	251	53	82	49	6	99	59.83
	50	0.85	1.04	635.68	261	245	251	55	82	49	6	99	59.83
8	52.5	0.85	1.04	637.18	261	245	251	55	82	49	6	99	59.83
	55	0.83	1.05	638.68	261	245	250	56	82	49	6	99	59.13
	57.5	0.83	1.05	640.16	261	245	250	54	80	50	6	100	59.13
	60			641.65									
Post-test Leak Check =		<0.02 at 15" Hg											
	Average	0.80	1.02	139.49	256	241	250	47	74	42	6	101	58

Sampling Results - Polycyclic Aromatic Hydrocarbons (PAH's)

Source: Main Stack Alt Fuels October

Test :	Blank	Test #1			Test #2			Test #3			AVERAGE RESULTS	
Sample Volume (Rm^3) [1] :	-	3.85			3.83			3.85				
Stack Flow Rate (Rm^3/s) [1] :	-	269.9			274.7			275.9			273.5	
	(µg)	(µg)	(µg/m³)	(µg/s)	(µg)	(µg/m³)	(µg/s)	(µg)	(µg/m³)	(µg/s)	(µg/m³)	(µg/s)
1-Methylnaphthalene	< 0.30	379	98.30	26500	316	82.60	22700	316	82.10	22600	87.70	24000
1-Methylphenanthrene	< 0.30	8.10	2.10	567	3.36	0.88	241	3.36	0.87	241	1.280	350.0
2-Chloronaphthalene	< 0.30	8.70	2.26	609	6.30	1.65	452	6.30	1.64	452	1.85	504.0
2-Methylanthracene	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.0781	< 21.4
2-Methylnaphthalene	< 0.30	551	143.00	38600	461	120.00	33100	461	120.00	33000	128.00	34900
3-Methylcholanthrene	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.0781	< 21.4
7,12-Dimethylbenzo(a)anthracene	< 1.2	< 1.2	0.31	84.1	< 1.2	0.31	86.1	< 1.2	0.31	86	< 0.312	< 85.4
9,10-Dimethylanthracene	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.08	< 21.4
9-Methylphenanthrene	< 0.30	18.4	4.77	1290	8.58	2.24	616	8.58	2.23	615	3.08	840
Acenaphthene	< 0.30	9.30	2.41	651	7.38	1.93	530	7.38	1.92	529	2.09	570
Acenaphthylene	< 0.30	16.7	4.33	1170	10.7	2.80	768	10.7	2.78	767	3.30	902
Anthracene	< 0.30	2.10	0.55	147	1.02	0.27	73.2	1.02	0.27	73.1	0.3590	97.8
Benzo(a)anthracene	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.0781	< 21.4
Benzo(a)fluorene	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.0781	< 21.4
Benzo(a)pyrene	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.0781	< 21.4
Benzo(b)fluoranthene	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.0781	< 21.4
Benzo(b)fluorene	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.0781	< 21.4
Benzo(e)pyrene	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.0781	< 21.4
Benzo(g,h,i)perylene	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.0781	< 21.4
Benzo(k)fluoranthene	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.0781	< 21.4
Chrysene	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.0781	< 21.4
Coronene	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.0781	< 21.4
Dibenzo(a,c)anthracene	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.0781	< 21.4
Fluoranthene	< 0.30	1.14	0.30	79.9	0.36	0.09	25.8	0.36	0.09	25.8	0.1610	43.8
Fluorene	< 0.30	10.4	2.70	728	7.56	1.98	543	7.56	1.96	542	2.210	604
Indeno(1,2,3-cd)pyrene	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.0781	< 21.4
Naphthalene	< 0.30	718	186.00	50300	620	162.00	44500	620	161.00	44400	170	46400
Perylene	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.0781	< 21.4
Phenanthrene	< 0.30	74.1	19.20	5190	36.1	9.44	2590	36.1	9.38	2590	12.70	3460.0
Picene	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.0781	< 21.4
Pyrene	< 0.30	0.54	0.14	37.8	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.0988	< 27.0
Tetralin	< 0.30	175	45.40	12300	173	45.20	12400	173	44.90	12400	45.2	12400
Triphenylene	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.0781	< 21.4
1,2,3,4-Tetrachlorobenzene	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.0781	< 21.4
1,2,3,5+1,2,4,5-Tetrachlorobenzene	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.0781	< 21.4
1,2,3-Trichlorobenzene	< 0.30	5.34	1.39	374	4.69	1.23	337	4.69	1.22	336	1.280	349
1,2,4-Trichlorobenzene	< 0.30	2.59	0.67	181	2.94	0.77	211	2.94	0.76	211	0.735	201
1,2-Dichlorobenzene	< 0.30	7.62	1.98	534	5.90	1.54	424	5.90	1.53	423	1.68	460
1,3,5-Trichlorobenzene	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.0781	< 21.4
1,3-Dichlorobenzene	< 0.30	3.40	0.88	238	3.01	0.79	216	3.01	0.78	216	0.817	223
1,4-Dichlorobenzene	< 0.30	2.29	0.59	160	2.01	0.53	144	2.01	0.52	144	0.547	150
Hexachlorobenzene	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.078	< 21.4
Pentachlorobenzene	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.078	< 21.4
2,3,4,5-Tetrachlorophenol	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.078	< 21.4
2,3,4,6-Tetrachlorophenol	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.078	< 21.4
2,3,4-Trichlorophenol	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.078	< 21.4
2,3,5,6-Tetrachlorophenol	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.078	< 21.4
2,3,5-Trichlorophenol	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.078	< 21.4
2,3,6-Trichlorophenol	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.078	< 21.4
2,3-Dichlorophenol	< 0.30	0.31	0.08	21.7	0.30	0.08	21.5	0.30	0.08	21.5	0.079	21.6
2,4 + 2,5-Dichlorophenol	< 0.30	0.74	0.19	51.8	0.67	0.18	48.1	0.67	0.17	48	0.180	49.3
2,4,5-Trichlorophenol	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.078	< 21.4
2,4,6-Trichlorophenol	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.078	< 21.4
2,6-Dichlorophenol	< 0.30	0.34	0.09	23.8	0.30	0.08	21.5	0.30	0.08	21.5	0.082	22.3
2-Chlorophenol	< 0.30	19.3	5.01	1350	17.6	4.60	1260	17.6	4.57	1260	4.73	1290
3,4,5-Trichlorophenol	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.078	< 21.4
3,4-Dichlorophenol	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.078	< 21.4
3,5-Dichlorophenol	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.078	< 21.4
3-Chlorophenol	< 0.30	4.46	1.16	312	3.94	1.03	283	3.94	1.02	282	1.070	293
4-Chlorophenol	< 0.30	4.10	1.06	287	3.82	1.00	274	3.82	0.99	274	1.020	278
Pentachlorophenol	< 0.30	< 0.30	0.08	21	< 0.30	0.08	21.5	< 0.30	0.08	21.5	< 0.078	< 21.4

Notes:

[1] Sample volume and volumetric flow rate based on dry referenced conditions (101.3kPa, and 25°*C)*

'<' *indicates that laboratory results were below the detection limit. The detection limit was used to calculate the concentration and emission rate.*

Concentration and Emission Rate has been reported to 3 ficant figures.

Sampling Results - Dioxins and Furans

Source: Main Stack Alt Fuels October

Test :	Blank	Test #1			Test #2			Test #3			Average Concentration	Average Concentration @25 °C and 11 % O_2	Reg 419 Toxic Equivalency Factors		
Sample Volume (m^3) [1] :		3.85			3.83			3.85					TEF	TEF Concentration	TEF Emission Rate
Stack Flow Rate (m^3/s) [1] :		269.9			274.7			275.9							
	(pg)	**(pg)**	**(pg/m^3)**	**(pg/s)**	**(pg)**	**(pg/m^3)**	**(pg/s)**	**(pg)**	**(pg/m^3)**	**(pg/s)**	**(pg/m^3)**	**(pg/m^3)**		**(pg TEQ/m^3)**	**(pg/s)**
2,3,7,8-Tetra CDD *	< 16	< 18	4.67	1260	< 16	4.18	1150	< 15	3.9	1080	4.3	7.56	1	7.56	1150
1,2,3,7,8-Penta CDD *	< 9.0	< 10	2.59	700	< 8.0	2.09	574	< 13	3.38	932	2.7	4.78	1	4.78	728
1,2,3,4,7,8-Hexa CDD *	< 6.6	< 6.9	1.79	483	< 6.6	1.72	474	< 6.7	1.74	480	1.8	3.12	0.1	0.312	47.5
1,2,3,6,7,8-Hexa CDD *	< 6.4	< 6.7	1.74	469	< 6.5	1.7	467	< 6.6	1.71	473	1.717	3.05	0.1	0.305	46.5
1,2,3,7,8,9-Hexa CDD *	< 6.0	< 6.3	1.63	441	< 6.1	1.59	438	< 6.2	1.61	444	1.613	2.87	0.1	0.287	43.7
1,2,3,4,6,7,8-Hepta CDD *	< 6.5	< 6.3	1.63	441	< 6.6	1.72	474	< 6.9	1.79	495	1.717	3.05	0.01	0.0305	4.65
1,2,3,4,6,7,8,9-Octa CDD *	19.4	14.9	3.87	1040	7.4	1.93	531	10.4	2.7	745	2.834	5.04	0.0003	0.00151	0.23
2,3,7,8-Tetra CDF **	< 7.7	30	7.78	2100	< 15	3.92	1080	< 12	3.12	860	4.9	8.79	0.1	0.879	134
1,2,3,7,8-Penta CDF **	< 6.5	< 6.6	1.71	462	< 6.9	1.8	495	< 7.0	1.82	502	1.778	3.16	0.03	0.0949	14.4
2,3,4,7,8-Penta CDF **	< 6.6	< 6.7	1.74	469	< 6.9	1.8	495	< 7.1	1.84	509	1.8	3.19	0.3	0.958	146
1,2,3,4,7,8-Hexa CDF **	< 6.1	< 6.2	1.61	434	< 9.6	2.51	689	< 7.0	1.82	502	1.979	3.52	0.1	0.352	53.6
1,2,3,6,7,8-Hexa CDF **	< 6.0	< 6.1	1.58	427	< 9.4	2.46	675	< 6.9	1.79	495	1.944	3.46	0.1	0.346	52.7
2,3,4,6,7,8-Hexa CDF **	< 6.6	< 6.7	1.74	469	< 10	2.61	718	< 7.6	1.97	545	2.109	3.75	0.1	0.375	57.1
1,2,3,7,8,9-Hexa CDF **	< 7.5	< 7.6	1.97	532	< 12	3.14	861	< 8.7	2.26	624	2.456	4.37	0.1	0.437	66.5
1,2,3,4,6,7,8-Hepta CDF **	< 5.9	< 6.1	1.58	427	9.2	2.4	660	< 6.1	1.58	437	1.857	3.30	0.01	0.033	5.03
1,2,3,4,7,8,9-Hepta CDF **	< 7.6	< 8.0	2.08	560	< 7.7	2.01	553	< 8.0	2.08	573	2.055	3.65	0.01	0.0365	5.57
1,2,3,4,6,7,8,9-Octa CDF **	11.9	< 6.3	1.63	441	9.6	2.51	689	< 6.3	1.64	452	1.927	3.43	0.0003	0.00103	0.157
33'44'-TetraCB-(77)	< 38	200	51.9	14000	96	25.1	6890	< 83	21.6	5950	32.85	58.42	0.0001	0.00584	0.89
344'5-TetraCB-(81)	< 38	< 42	10.9	2940	< 81	21.2	5820	< 82	21.3	5880	17.79	31.64	0.0003	0.00949	1.45
233'44'-PentaCB-(105)	< 33	460	119	32200	170	44.4	12200	140	36.4	10000	66.72	118.66	0.00003	0.00356	0.542
2344'5-PentaCB-(114)	< 33	49	12.7	3430	< 43	11.2	3090	< 54	14	3870	12.66	22.52	0.00003	0.000675	0.103
23'44'5-PentaCB-(118)	100	1500	389	105000	600	157	43100	450	117	32300	221	393.04	0.00003	0.0118	1.8
23'44'5'-PentaCB-(123)	< 37	< 53	13.8	3710	< 48	12.5	3450	< 60	15.6	4300	13.96	24.83	0.00003	0.000745	0.113
33'44'5-PentaCB-(126)	< 31	< 37	9.6	2590	< 41	10.7	2940	< 51	13.2	3660	11.19	19.90	0.1	1.99	303
HexaCB-(156)+(157)	< 41	110	28.5	7710	< 50	13.1	3590	< 75	19.5	5380	20.36	36.21	0.00003	0.00109	0.165
23'44'55'-HexaCB-(167)	< 39	60	15.6	4200	< 48	12.5	3450	< 71	18.4	5090	15.52	27.60	0.00003	0.000828	0.126
33'44'55'-HexaCB-(169)	< 42	< 45	11.7	3150	< 51	13.3	3660	< 76	19.7	5450	14.92	26.53	0.03	0.796	121
233'44'55'-HeptaCB-(189)	< 33	< 43	11.2	3010	< 36	9.41	2580	< 40	10.4	2870	10.32	18.35	0.00003	0.000551	0.0839
											Total Toxic Equivalency →			19.60	2990

Notes:

[1] Sample volume and volumetric flow rate based on dry referenced conditions (101.3 kPa and 25°C)

'<' indicates that laboratory results were below the Reportable Detection Limit (RDL) This detection limit was used to calculate the concentration and emission rate.

Concentration and Emission Rate has been reported to 3 significant figures.

*CDD = chlorodibenzo-*p*-dioxin

**CDF = chlorodibenzo-*p*-furan

***CB = chlorobenzene

Semi-Volatile Organic Compounds Sampling
St. Mary's

Facility: St. Mary's			**Operator:** DO		
City: Bowmanville, ON			**Entered by:** TFL		
Source: Main Stack Alt Fuels October			**Checked by:** KNE		
Reference Method: Environment Canada 1/RM/2					

DATA INPUTS	**Symbol**	**Units**	**Test #1** SVOC	**Test #2** SVOC	**Test #3** SVOC
Date			10-Oct-18	12-Oct-18	12-Oct-18
Start Time			11:53 AM	8:45 AM	1:57 PM
End Time			2:00 PM	1:15 PM	4:00 PM
Round Stack, Diameter (Inside)	d_s	in	216	216	216
Standard Temperature	T_s	°F	77	77	77
Standard Pressure	P_s	" Hg	29.9	29.9	29.9
Nozzle Diameter	D_n	in	0.211	0.211	0.211
Average Stack Temperature	T_s	°F	274	267	266
Average Meter Temperature	T_m	°F	85	64	68
Barometric Pressure	P_{bar}	" Hg	29.4	29.3	29.3
Stack Static Pressure	P_g	" H_2O	-0.17	-0.17	-0.17
Average Delta H	dH	" H_2O	1.01	0.97	0.98
Average Velocity Head	dP_{rms}	" H_2O	0.79	0.79	0.79
Pitot Coefficient	C_p	-	0.824	0.824	0.824
		Pitot ID ->	RWDI 7' #1		
Gas Sample Volume	V_m	ft³	140.53	134.58	136.48
DGM Calibration Factor	Y	-	0.998	0.998	0.998
		DGM ID ->	Envirosolve #2		
Total Sampling Time	min	min	240	240	240
Stack Gas Oxygen Concentration	O_2	%	15.6	15.4	15.0
Stack Gas Carbon Dioxide Concentration	CO_2	%	11.4	10.3	10.6
Impinger Gain	W_w	g	309.7	243.8	243.1

Semi-Volatile Organic Compounds Sampling

Facility:	St. Mary's	**Operator:**	DO
City:	Bowmanville, ON	**Entered by:**	TFL
Source:	Main Stack Alt Fuels October	**Checked by:**	KNE
Reference Method:	Environment Canada 1/RM/2		

Emissions Calculations	**Symbol**	**Units**	**Test #1** SVOC	**Test #2** SVOC	**Test #3** SVOC	**AVERAGE**
Nozzle Area	A_n	ft^2	0.00024	0.00024	0.00024	
Stack Area	A_s	ft^2	254.47	254.47	254.47	
Average Stack Temperature	T_s	°R	734	727	726	729
Average DGM Temperature	T_m	°R	545	524	528	
Sample Volume at Reference Conditions	V_{mStd}	ft^3	136.17	135.20	136.04	
	V_{mmstd}	**m^3**	**3.85**	**3.83**	**3.85**	
Vol. of Water Vapour	V_{wStd}	ft^3	14.8656	11.7024	11.6688	
Water Fraction	B_{ws}		9.8%	8.0%	7.9%	8.6%
Molecular Weight, dry	M_d	g/mole	30.55	30.37	30.40	30.44
Molecular Weight, wet	M_w	g/mole	29.32	29.38	29.42	29.37
Absolute Stack Pressure	P_s	" Hg	29.39	29.29	29.29	29.32
Stack Gas Velocity	U_s	ft/s	57.84	57.27	57.46	57.53
	U_{sm}	**m/s**	**17.63**	**17.46**	**17.51**	**17.53**
Actual Gas Flow Rate	Q_{act}	acf/min	883,126	874,461	877,317	878,301
Dry Gas Flow Rate (dry, ref)	Q_{ref}	dscf/min	572,114	582,153	584,794	579,687
	Q_{Rm}	m^3/min	16197	16481	16556	16,411
	Qmref (Actual O_2)	**m^3/s**	**269.94**	**274.68**	**275.93**	**273.5**
	Qmref (11% O_2)	**m^3/sec**	**143.1**	**151.1**	**162.8**	**152.3**
Isokinetic Rate	I	%	104	101	102	102

Semi-Volatile Organic Compounds Sampling

Facility:	St. Mary's	**Operator:**	DO
City:	Bowmanville, ON	**Entered by:**	TFL
Source:	Main Stack Alt Fuels October	**Checked by:**	KNE
Reference Method:	Environment Canada 1/RM/2	**Test Date:**	10-Oct-18
Run:	Test 1		

Point	Time (min)	Velocity Pressure (" H_2O)	Orifice Pressure (" H_2O)	Meter Volume (ft^3)	Stack Temp (^oF)	Probe Temp (^oF)	Box Temp (^oF)	Imp Temp (^oF)	Meter Temp (^oF)	XAD Trap (^oF)	Flex Line Temp (^oF)	Vacuum Pressure (" Hg)	Percentage Isokinetic (%)	Stack Velocity (ft/s)
Traverse 1- East														
Pre-Test Leak Check =		<0.02 at 10" Hg												
1	0	0.86	1.00	51.09	295	240	250	70	83	-		-5.0	107	61.06
	2.5	0.89	1.00	52.63	295	240	250	70	83	65		-5	103	62.11
	5	0.89	1.00	54.14	295	240	250	68	84	65		-6	103	62.11
2	7.5	0.89	1.10	55.65	291	240	250	69	84	60		-6	102	61.95
	10	0.89	1.10	57.15	290	240	250	63	84	55		-6	102	61.90
	12.5	0.89	1.10	58.65	290	240	250	61	85	52		-6	102	61.90
3	15	0.90	1.15	60.15	290	240	250	61	85	50		-6	102	62.25
	17.5	0.90	1.15	61.67	290	240	250	61	85	48		-6	104	62.25
	20	0.90	1.15	63.21	290	240	250	59	87	48		-6	103	62.25
4	22.5	0.90	1.15	64.74	287	240	250	59	87	48		-6	102	62.13
	25	0.90	1.15	66.26	286	240	250	59	88	50		-6	104	62.09
	27.5	0.88	1.10	67.81	286	240	250	59	89	50		-6	103	61.39
5	30	0.85	1.05	69.33	286	240	250	59	89	50		-6	107	60.34
	32.5	0.85	1.05	70.89	285	240	250	60	90	52		-6	103	60.30
	35	0.85	1.05	72.39	284	240	250	61	90	54		-6	103	60.26
6	37.5	0.85	1.05	73.89	284	240	250	61	92	56		-6	102	60.26
	40	0.85	1.05	75.38	283	240	250	61	92	58		-6	103	60.21
	42.5	0.85	1.07	76.89	283	240	250	62	93	59		-6	102	60.21
7	45	0.75	0.96	78.39	281	240	250	63	93	60		-6	106	56.49
	47.5	0.75	0.96	79.85	280	240	250	63	94	61		-6	104	56.45
	50	0.75	0.96	81.29	279	240	250	64	94	62		-6	105	56.41
8	52.5	0.75	0.95	82.75	280	240	250	64	94	62		-6	103	56.45
	55	0.75	0.95	84.18	280	240	250	64	95	63		-6	104	56.45
	57.5	0.70	0.90	85.63	280	240	250	65	95	63		-6	105	54.53
	60	-	-	87.04	-	-	-	-	-	-		-	-	-
Traverse 2 - North														
1	0	0.70	0.90	87.04	280	240	250	65	95	65		-6	110	54.53
	2.5	0.75	0.96	88.51	280	240	250	65	95	65		-6	99	56.45
	5	0.75	0.96	89.89	280	240	250	65	95	65		-6	105	56.45
2	7.5	0.75	0.96	91.35	280	240	250	65	96	65		-6	104	56.45
	10	0.75	0.95	92.80	280	240	250	65	96	47		-6	105	56.45
	12.5	0.75	0.95	94.26	278	240	250	63	97	45		-6	104	56.37
3	15	0.75	0.94	95.71	278	240	250	61	97	45		-6	103	56.37
	17.5	0.80	1.05	97.15	277	240	250	60	97	45		-6	103	58.18
	20	0.80	1.05	98.64	277	240	250	59	98	45		-6	105	58.18
4	22.5	0.80	1.05	100.16	277	240	250	58	98	45		-6	105	58.18
	25	0.85	1.10	101.67	277	240	250	58	98	46		-6	103	59.97
	27.5	0.85	1.10	103.20	276	240	250	57	98	47		-6	103	59.93
5	30	0.85	1.10	104.74	276	240	250	58	99	48		-6	104	59.93
	32.5	0.85	1.10	106.29	275	240	250	58	99	50		-6	100	59.89
	35	0.85	1.10	107.79	275	240	250	58	99	51		-6	103	59.89
6	37.5	0.85	1.10	109.33	275	240	250	58	99	51		-6	129	59.89
	40	0.85	1.10	111.26	274	240	250	59	100	53		-6	102	59.85
	42.5	0.85	1.10	112.78	274	240	250	60	100	53		-6	102	59.85
7	45	0.85	1.10	114.30	273	240	250	60	101	56		-6	102	59.81
	47.5	0.85	1.10	115.83	275	240	250	61	101	57		-6	101	59.89
	50	0.85	1.10	117.35	274	240	250	61	101	57		-6	102	59.85
8	52.5	0.85	1.10	118.88	274	240	250	62	101	58		-6	101	59.85
	55	0.85	1.10	120.40	274	240	250	63	101	60		-6	102	59.85
	57.5	0.90	1.20	121.93	273	240	250	63	101	60		-6	103	61.54
	60			123.52										
Traverse 3 - West														
1	0	0.85	1.15	123.52	271	240	250	65	100	63		-6.0	100	59.73
	2.5	0.82	1.10	125.02	271	240	250	67	99	44		-6	103	58.66
	5	0.82	1.10	126.54	270	240	250	63	100	44		-6	103	58.62
2	7.5	0.82	1.10	128.06	270	240	250	65	100	43		-6	101	58.62
	10	0.80	1.05	129.55	270	240	250	65	100	43		-6	102	57.90
	12.5	0.78	1.03	131.03	271	240	250	64	101	44		-6	108	57.21
3	15	0.78	1.03	132.58	270	240	250	64	101	44		-6	102	57.18
	17.5	0.78	1.03	134.05	271	240	250	63	101	45		-6	104	57.21
	20	0.75	1.05	135.55	270	240	250	64	101	46		-6	106	56.06
4	22.5	0.75	1.10	137.05	270	240	250	63	101	46		-6	107	56.06
	25	0.75	1.10	138.56	270	240	250	63	101	46		-6	107	56.06
	27.5	0.75	1.10	140.07	271	240	250	64	101	46		-6	107	56.10
5	30	0.75	1.00	141.58	269	240	250	64	100	46		-6	107	56.03
	32.5	0.80	1.10	143.09	275	225	250	60	66	44		-6	108	58.10
	35	0.75	0.92	144.56	273	225	250	57	66	44		-6	105	56.18
6	37.5	0.75	0.92	145.95	273	225	250	57	66	44		-6	106	56.18
	40	0.75	0.92	147.35	273	225	250	56	67	44		-6	105	56.18
	42.5	0.75	0.92	148.74	272	225	250	56	67	44		-6	105	56.14
7	45	0.75	0.92	150.13	274	225	250	54	68	44		-6	102	56.22
	47.5	0.75	0.92	151.49	274	225	250	54	68	44		-6	102	56.22
	50	0.75	0.92	152.85	273	225	250	54	69	44		-6	102	56.18
8	52.5	0.75	0.92	154.21	274	225	250	54	69	44		-6	102	56.22
	55	0.75	0.92	155.56	274	225	250	52	70	44		-5	104	56.22
	57.5	0.75	0.92	156.94	274	225	250	53	70	44		-5	103	56.22
	60			158.31										
Traverse 4- East														
1	0	0.75	0.92	158.31	261	240	251	51	76	43		-	102	55.72
	2.5	0.75	0.92	159.70	261	240	245	50	76	44		-7	101	55.72
	5	0.80	1.00	161.07	260	232	245	48	76	44		-7	103	57.51
2	7.5	0.80	1.00	162.52	260	247	247	48	77	45		-7	102	57.51
	10	0.80	1.00	163.96	261	240	252	48	77	45		-7	102	57.55
	12.5	0.80	1.00	165.39	262	240	239	48	77	45		-7	103	57.59
3	15	0.80	1.00	166.83	262	252	239	48	77	45		-7	103	57.59
	17.5	0.80	1.00	168.27	262	241	250	49	77	47		-7	103	57.59
	20	0.75	0.92	169.71	262	240	250	49	77	47		-7	102	55.76
4	22.5	0.75	0.92	171.09	262	240	249	50	77	48		-7	101	55.76
	25	0.75	0.92	172.47	262	240	251	50	77	48		-7	101	55.76
	27.5	0.75	0.92	173.85	261	239	250	50	77	50		-7	101	55.72
5	30	0.75	0.92	175.23	263	239	249	50	77	50		-7	101	55.80
	32.5	0.75	0.92	176.61	263	240	250	50	77	50		-7	101	55.80
	35	0.75	0.92	177.99	263	241	250	50	77	50		-7	101	55.80
6	37.5	0.75	0.92	179.37	263	239	241	51	77	52		-7	101	55.80
	40	0.75	0.92	180.74	263	240	250	51	77	52		-7	102	55.80
	42.5	0.75	0.92	182.12	262	240	249	52	77	53		-7	101	55.76
7	45	0.70	0.88	183.49	263	240	250	52	77	53		-7	103	53.90
	47.5	0.70	0.88	184.84	263	238	251	52	77	54		-7	104	53.90
	50	0.70	0.88	186.20	263	241	250	52	77	54		-7	109	53.90
8	52.5	0.70	0.88	187.63	264	240	248	52	77	54		-7	105	53.94
	55	0.70	0.88	189.01	263	230	239	52	77	54		-7	95	53.90
	57.5	0.70	0.88	190.26	262	241	242	51	77	55		-7	103	53.87
	60			191.61										
Post-Test Leak Check =		<0.02 at 12" Hg												
	Average	0.79	1.01	140.53	274.13	238.28	249.34	58.47	84.88	50.91	#DIV/0!	-6.20	103.51	57.84

Semi-Volatile Organic Compounds Sampling

Facility: St. Mary's
City: Bowmanville, ON
Source: Main Stack Alt Fuels October
Reference Method: Environment Canada 1/RM/2
Run: Test 2

Operator: DO
Entered by: TFL
Checked by: KNE
Test Date: 12-Oct-18

Point	Time (min)	Velocity Pressure (" H_2O)	Orifice Pressure (" H_2O)	Meter Volume (ft^3)	Stack Temp (^oF)	Probe Temp (^oF)	Box Temp (^oF)	Imp Temp (^oF)	Meter Temp (^oF)	XAD Trap (^oF)	Flex Line Temp (^oF)	Vacuum Pressure (" Hg)	Percentage Isokinetic (%)	Stack Velocity (ft/s)
Traverse 1- East														
Pre-Test Leak Check =	<0.02 at 10" Hg													
1	0	0.85	1.10	191.92	265	225	250	44	55	53		-6	103	59.51
	2.5	0.90	1.10	193.38	267	225	250	43	56	41		-6	98	61.32
	5	0.90	1.10	194.80	267	225	250	43	54	40		-6	101	61.32
2	7.5	0.85	1.05	196.26	267	225	250	43	58	40		-6	101	59.60
	10	0.85	1.05	197.69	268	225	250	43	59	40		-6	101	59.64
	12.5	0.85	1.05	199.12	260	225	250	43	59	40		-6	99	59.31
3	15	0.85	1.05	200.53	268	225	250	42	60	40		-6	102	59.64
	17.5	0.85	1.05	201.99	267	225	250	41	61	39		-6	101	59.60
	20	0.85	1.05	203.43	267	225	250	42	62	39		-6	101	59.60
4	22.5	0.90	1.10	204.87	267	225	250	42	62	40		-6	100	61.32
	25	0.90	1.10	206.35	269	225	250	42	62	40		-6	99	61.41
	27.5	0.85	1.05	207.81	269	225	250	42	62	40		-6	101	59.68
5	30	0.85	1.05	209.25	267	225	250	41	63	39		-6	100	59.60
	32.5	0.85	1.05	210.68	267	225	250	41	63	39		-6	101	59.60
	35	0.85	1.05	212.13	267	225	250	41	63	39		-6	99	59.60
6	37.5	0.85	1.05	213.55	268	225	250	41	63	39		-6	102	59.64
	40	0.85	1.05	215.01	268	225	250	41	63	39		-6	100	59.64
	42.5	0.85	1.05	216.45	267	225	250	41	63	39		-6	100	59.60
7	45	0.75	0.93	217.89	267	225	250	40	63	39		-6	101	55.98
	47.5	0.80	0.99	219.25	268	225	250	40	63	39		-6	105	57.86
	50	0.80	0.98	220.71	267	225	250	40	64	39		-6	103	57.82
8	52.5	0.75	0.93	222.14	267	225	250	44	64	39		-6	102	55.98
	55	0.75	0.93	223.52	267	225	250	44	64	39		-6	104	55.98
	57.5	0.75	0.93	224.92	267	225	250	44	60	39		-6	102	55.98
	60			226.29										
Traverse 2 - North														
1	0	0.80	0.99	226.29	267	225	250	44	60	39		-6	102	57.82
	2.5	0.80	0.99	227.70	266	225	250	44	62	39		-6	101	57.78
	5	0.80	0.99	229.11	267	225	250	44	62	39		-6	102	57.82
2	7.5	0.80	0.99	230.53	267	225	250	42	62	39		-6	101	57.82
	10	0.75	0.99	231.94	266	225	250	42	63	39		-6	103	55.94
	12.5	0.75	0.99	233.33	266	225	250	43	63	39		-6	102	55.94
3	15	0.75	0.99	234.70	266	225	250	43	63	42		-6	102	55.94
	17.5	0.80	0.99	236.08	266	225	250	44	63	43		-6	101	57.78
	20	0.80	0.99	237.49	266	225	250	44	63	43		-6	101	57.78
4	22.5	0.80	0.99	238.90	265	225	250	44	63	43		-6	102	57.74
	25	0.85	1.05	240.32	266	225	250	44	63	44		-6	100	59.55
	27.5	0.85	1.05	241.76	265	225	250	44	63	44		-6	105	59.51
5	30	0.85	1.05	243.27	260	225	250	44	63	44		-6	96	59.31
	32.5	0.85	1.05	244.65	264	225	250	44	63	44		-6	101	59.47
	35	0.85	1.05	246.10	266	225	250	44	63	44		-6	101	59.55
6	37.5	0.85	1.05	247.55	266	225	250	44	63	44		-6	101	59.55
	40	0.85	1.05	249.00	266	225	250	46	63	48		-6	101	59.55
	42.5	0.85	1.05	250.45	266	225	250	46	63	48		-6	101	59.55
7	45	0.85	1.05	251.90	267	225	250	46	64	48		-6	101	59.60
	47.5	0.85	1.05	253.35	267	225	250	46	64	48		-6	99	59.60
	50	0.85	1.05	254.77	268	225	250	46	64	50		-6	99	59.64
8	52.5	0.85	1.05	256.20	268	225	250	46	65	50		-6	101	59.64
	55	0.85	1.05	257.65	267	225	250	46	65	50		-6	101	59.60
	57.5	0.85	1.05	259.10	267	225	250	47	65	50		-6	101	59.60
	60			260.55			250							
Traverse 3 - West														
1	0	0.80	0.99	260.55	266	225	250	46	60	49		-6	101	57.78
	2.5	0.80	0.99	261.95	266	225	250	46	61	50		-6	103	57.78
	5	0.80	0.99	263.38	268	225	250	46	62	52		-6	101	57.86
2	7.5	0.80	0.99	264.79	267	225	250	46	63	52		-6	102	57.82
	10	0.80	0.99	266.21	268	225	250	46	63	53		-6	106	57.86
	12.5	0.80	0.99	267.69	268	225	250	46	63	54		-6	97	57.86
3	15	0.75	0.93	269.04	268	225	250	46	63	54		-6	103	56.02
	17.5	0.75	0.91	270.43	269	225	250	46	63	54		-6	102	56.06
	20	0.75	0.91	271.81	268	240	250	46	64	54		-6	101	56.02
4	22.5	0.75	0.91	273.18	268	240	250	46	65	54		-6	101	56.02
	25	0.75	0.91	274.55	269	240	250	46	65	53		-6	101	56.06
	27.5	0.75	0.91	275.91	269	240	250	49	65	53		-6	102	56.06
5	30	0.75	0.91	277.29	269	240	250	49	65	53		-6	102	56.06
	32.5	0.75	0.91	278.67	269	240	250	49	65	53		-6	101	56.06
	35	0.75	0.91	280.04	268	240	250	49	65	53		-6	101	56.02
6	37.5	0.70	0.86	281.41	269	240	250	49	65	54		-6	106	54.16
	40	0.70	0.86	282.79	269	240	250	49	65	54		-6	101	54.16
	42.5	0.70	0.86	284.11	270	240	250	49	65	54		-6	103	54.19
7	45	0.65	0.80	285.45	270	240	250	50	65	55		-6	100	52.22
	47.5	0.65	0.80	286.71	268	240	250	50	65	55		-6	106	52.15
	50	0.65	0.80	288.05	267	240	250	50	65	55		-6	105	52.11
8	52.5	0.70	0.86	289.38	268	240	250	50	65	55		-6	101	54.12
	55	0.70	0.86	290.70	268	240	250	50	65	55		-6	105	54.12
	57.5	0.70	0.86	292.07	266	240	250	50	65	55		-6	101	54.04
	60			293.39										
Traverse 4- South														
1	0	0.70	0.85	293.39	267	240	250	50	65	55		-6	102	54.08
	2.5	0.70	0.85	294.73	267	240	250	50	65	55		-6	101	54.08
	5	0.70	0.85	296.05	267	240	250	50	65	55		-6	103	54.08
2	7.5	0.75	0.92	297.39	267	240	250	50	66	55		-6	101	55.98
	10	0.75	0.92	298.76	267	240	250	50	66	55		-6	103	55.98
	12.5	0.75	0.92	300.15	268	240	250	51	67	56		-6	101	56.02
3	15	0.75	0.92	301.52	268	240	250	52	67	57		-6	102	56.02
	17.5	0.75	0.92	302.90	267	240	250	52	67	57		-6	101	55.98
	20	0.75	0.92	304.27	267	240	250	52	67	57		-6	101	55.98
4	22.5	0.75	0.92	305.64	266	240	250	52	68	57		-6	101	55.94
	25	0.80	0.98	307.02	266	240	250	52	68	57		-6	102	57.78
	27.5	0.80	0.97	308.46	265	240	250	54	68	59		-6	100	57.74
5	30	0.80	0.93	309.87	266	240	250	54	68	59		-6	99	57.78
	32.5	0.70	0.92	311.26	264	240	250	54	68	58		-6	105	53.97
	35	0.75	0.94	312.65	264	240	250	54	68	59		-6	102	55.86
6	37.5	0.75	0.94	314.04	266	225	250	53	69	59		-6	102	55.94
	40	0.75	0.94	315.43	266	225	250	53	69	59		-6	103	55.94
	42.5	0.75	0.94	316.83	266	225	250	54	69	58		-6	101	55.94
7	45	0.75	0.91	318.21	265	225	250	54	69	58		-6	103	55.90
	47.5	0.75	0.91	319.61	265	225	250	54	69	58		-6	100	55.90
	50	0.75	0.91	320.97	265	225	250	54	69	58		-6	100	55.90
8	52.5	0.75	0.91	322.34	264	225	250	54	69	58		-6	100	55.86
	55	0.75	0.92	323.70	264	225	250	54	69	58		-6	102	55.86
	57.5	0.75	0.92	325.09	265	225	250	54	69	58		-6	103	55.90
	60			326.50										
Post-Test Leak Check =	<0.02 at 12" Hg													
	Average	0.79	0.97	134.58	266.77	229.84	250.00	46.72	63.76	48.74	#DIV/0!	-6.00	101.46	57.27

Semi-Volatile Organic Compounds Sampling

Facility:	St. Mary's	**Operator:**	DO
City:	Bowmanville, ON	**Entered by:**	TFL
Source:	Main Stack Alt Fuels October	**Checked by:**	KNE
Reference Method:	Environment Canada 1/RM/2	**Test Date:**	12-Oct-18
Run:	Test 3		

Point	Time (min)	Velocity Pressure (" H_2O)	Orifice Pressure (" H_2O)	Meter Volume (ft^3)	Stack Temp (^oF)	Probe Temp (^oF)	Box Temp (^oF)	Imp Temp (^oF)	Meter Temp (^oF)	XAD Trap (^oF)	Vacuum Pressure (" Hg)	Percentage Isokinetic (%)	Stack Velocity (ft/sec)
Traverse 1- West													
Pre-test Leak Check =		<0.02 at 10" Hg											
1	0	0.85	1.05	326.70	264	225	250	48	60	48	-5.0	101	59.43
	2.5	0.85	1.05	328.14	264	225	250	47	60	48	-5	97	59.43
	5	0.85	1.05	329.53	264	225	250	47	61	48	-5	97	59.43
2	7.5	0.85	1.05	330.92	263	225	250	47	61	48	-6	102	59.39
	10	0.85	1.05	332.38	268	235	250	45	63	48	-6	103	59.60
	12.5	0.85	1.05	333.85	268	235	250	45	63	48	-6	102	59.60
3	15	0.85	1.05	335.31	264	240	250	45	63	48	-6	108	59.43
	17.5	0.85	1.05	336.87	264	240	250	45	64	48	-6	103	59.43
	20	0.85	1.05	338.35	266	240	250	45	65	48	-6	103	59.52
4	22.5	0.85	1.05	339.83	266	240	250	45	65	50	-6	100	59.52
	25	0.85	1.05	341.27	266	240	250	45	65	50	-6	101	59.52
	27.5	0.85	1.05	342.73	266	240	250	45	66	50	-6	100	59.52
5	30	0.85	1.05	344.17	266	240	250	45	67	50	-6	102	59.52
	32.5	0.85	1.05	345.64	265	240	250	45	67	55	-6	101	59.48
	35	0.85	1.05	347.11	266	240	250	45	68	55	-6	102	59.52
6	37.5	0.8	1.05	348.59	266	240	250	45	68	55	-6	102	57.74
	40	0.8	0.99	350.02	265	240	250	45	68	55	-6	102	57.70
	42.5	0.8	0.99	351.46	267	240	250	46	69	55	-6	101	57.78
7	45	0.8	0.99	352.89	266	240	250	46	69	60	-6	102	57.74
	47.5	0.8	0.99	354.33	266	240	250	46	69	60	-6	101	57.74
	50	0.75	0.92	355.76	266	240	250	45	69	60	-6	101	55.91
8	52.5	0.75	0.92	357.14	266	240	250	45	69	60	-6	101	55.91
	55	0.8	0.99	358.52	266	240	250	46	70	60	-6	101	57.74
	57.5	0.8	0.99	359.95	266	240	250	46	70	60	-6	102	57.74
	60			361.39									
Traverse 2- North													
1	0	0.8	0.99	361.39	268	240	250	48	67	60	-6.0	100	57.82
	2.5	0.8	0.99	362.79	267	240	250	46	68	60	-6	102	57.78
	5	0.8	0.99	364.23	267	240	250	46	69	60	-6	102	57.78
2	7.5	0.8	0.99	365.66	267	240	250	45	69	60	-6	102	57.78
	10	0.8	0.99	367.10	267	240	250	45	69	60	-6	101	57.78
	12.5	0.8	0.99	368.53	267	240	250	45	70	60	-6	102	57.78
3	15	0.8	0.99	369.97	267	240	250	45	70	60	-6	101	57.78
	17.5	0.8	0.99	371.39	268	240	250	45	71	60	-6	103	57.82
	20	0.8	0.99	372.85	268	240	250	45	71	60	-6	101	57.82
4	22.5	0.8	0.99	374.28	268	240	250	45	71	60	-6	103	57.82
	25	0.8	0.99	375.73	268	240	250	45	71	60	-6	102	57.82
	27.5	0.8	0.99	377.17	267	240	250	45	71	60	-6	102	57.78
5	30	0.8	0.99	378.61	267	240	250	46	71	59	-6	102	57.78
	32.5	0.8	0.99	380.05	268	240	250	46	71	59	-6	102	57.82
	35	0.8	0.99	381.49	267	240	250	46	71	59	-6	102	57.78
6	37.5	0.85	1.05	382.93	267	240	250	47	71	59	-6	100	59.56
	40	0.85	1.05	384.39	267	240	250	48	71	58	-6	98	59.56
	42.5	0.85	1.05	385.82	267	240	250	48	71	58	-6	102	59.56
7	45	0.85	1.05	387.30	267	240	250	48	71	58	-6	101	59.56
	47.5	0.85	1.05	388.77	267	240	250	48	71	58	-6	101	59.56
	50	0.85	1.05	390.24	268	240	250	48	71	58	-6	100	59.60
8	52.5	0.85	1.05	391.69	268	240	250	48	71	58	-6	100	59.60
	55	0.85	1.05	393.15	265	240	250	48	71	58	-6	101	59.48
	57.5	0.85	1.05	394.62	265	240	250	48	71	58	-6	99	59.48
	60			396.07									
Traverse 3- West													
1	0	0.8	1.00	396.07	262	240	250	48	68	48	-6.0	102	57.58
	2.5	0.8	1.00	397.51	267	240	250	46	69	55	-6	101	57.78
	5	0.8	1.00	398.93	266	240	250	46	69	55	-6	102	57.74
2	7.5	0.8	1.00	400.37	267	240	250	46	69	55	-6	102	57.78
	10	0.8	1.00	401.80	266	240	250	46	70	55	-6	103	57.74
	12.5	0.8	1.00	403.25	267	240	250	46	70	55	-6	101	57.78
3	15	0.8	1.00	404.68	266	240	250	46	70	55	-6	103	57.74
	17.5	0.8	1.00	406.13	266	240	250	46	70	55	-6	101	57.74
	20	0.8	1.00	407.56	267	240	250	46	70	55	-6	103	57.78
4	22.5	0.8	1.00	409.01	266	240	250	44	70	55	-6	102	57.74
	25	0.8	1.00	410.45	266	240	250	44	70	55	-6	102	57.74
	27.5	0.8	1.00	411.89	266	240	250	44	71	55	-6	103	57.74
5	30	0.8	1.00	413.34	266	240	250	44	71	55	-6	101	57.74
	32.5	0.78	0.98	414.77	266	240	250	44	71	55	-6	101	57.01
	35	0.75	0.95	416.18	266	240	250	44	71	55	-6	104	55.91
6	37.5	0.75	0.95	417.61	266	240	250	47	71	55	-6	102	55.91
	40	0.75	0.95	419.00	268	240	250	47	71	55	-6	101	55.98
	42.5	0.75	0.95	420.38	267	240	250	47	71	55	-6	101	55.94
7	45	0.75	0.95	421.76	268	240	250	47	71	55	-6	102	55.98
	47.5	0.75	0.95	423.15	268	240	250	47	69	55	-6	101	55.98
	50	0.75	0.95	424.53	268	240	250	47	69	55	-6	102	55.98
8	52.5	0.75	0.95	425.92	267	240	250	47	69	53	-6	102	55.94
	55	0.75	0.95	427.31	267	240	250	47	68	53	-6	102	55.94
	57.5	0.75	0.95	428.70	267	240	250	47	68	53	-6	100	55.94
	60			430.06									
Traverse 4 - South													
1	0	0.75	0.95	430.06	267	240	250	48	66	53	-6.0	103	55.94
	2.5	0.75	0.95	431.45	264	240	250	48	66	50	-6	102	55.83
	5	0.70	0.87	432.83	264	240	250	50	66	50	-6	102	53.94
2	7.5	0.70	0.87	434.17	265	240	250	50	66	50	-6	103	53.97
	10	0.70	0.85	435.52	265	240	250	48	67	50	-6	102	53.97
	12.5	0.70	0.85	436.86	264	240	250	48	67	50	-6	102	53.94
3	15	0.70	0.85	438.20	264	240	250	48	67	50	-6	100	53.94
	17.5	0.70	0.85	439.52	264	240	250	48	67	50	-6	101	53.94
	20	0.70	0.85	440.85	265	240	250	49	67	50	-6	101	53.97
4	22.5	0.75	0.94	442.18	265	240	250	49	67	50	-6	103	55.87
	25	0.75	0.93	443.58	265	240	250	49	67	47	-6	101	55.87
	27.5	0.75	0.93	444.96	266	240	250	49	67	47	-6	105	55.91
5	30	0.75	0.91	446.38	267	240	250	49	67	47	-6	101	55.94
	32.5	0.75	0.91	447.75	268	240	250	49	67	47	-6	102	55.98
	35	0.75	0.92	449.13	268	240	250	50	67	45	-6	102	55.98
6	37.5	0.75	0.92	450.52	268	240	250	50	66	45	-6	101	55.98
	40	0.75	0.92	451.89	267	240	250	50	66	45	-6	102	55.94
	42.5	0.75	0.92	453.27	267	240	250	49	66	45	-6	102	55.94
7	45	0.75	0.99	454.65	268	240	250	49	66	43	-6	101	55.98
	47.5	0.80	0.99	456.02	267	240	250	49	66	43	-6	103	57.78
	50	0.80	0.99	457.46	268	240	250	49	66	43	-6	102	57.82
8	52.5	0.80	0.99	458.89	268	240	250	49	66	43	-6	102	57.82
	55	0.80	0.99	460.32	268	240	250	49	66	43	-6	103	57.82
	57.5	0.80	0.99	461.76	268	240	250	50	66	43	-6	102	57.82
	60			463.18									
Post-test Leak Check =		<0.02 at 15" Hg											
Average		0.79	0.98	136.48	266	239	250	47	68	53	-6	102	57

Sampling Results - Polycyclic Aromatic Hydrocarbons (PAH's)

Source: Main Stack

Test :	Blank	Test #1			Test #2			Test #3			AVERAGE RESULTS	
Sample Volume (Rm^3) [1] :	-	4.05			4.01			3.82				
Stack Flow Rate (Rm^3/s) [1] :	-	288.7			290.8			278.3			285.9	
	(µg)	(µg)	(µg/m^3)	(µg/s)	(µg)	(µg/m^3)	(µg/s)	(µg)	(µg/m^3)	(µg/s)	(µg/m^3)	(µg/s)
1-Methylnaphthalene	< 0.30	318	78.60	22700	287	71.60	20800	306	80.00	22300	76.70	< 21900
1-Methylphenanthrene	< 0.30	1.62	0.40	116	0.84	0.21	60.9	0.48	0.13	34.9	0.245	< 70.5
2-Chloronaphthalene	< 0.30	4.44	1.10	317	4.08	1.02	296	3.90	1.02	284	1.05	< 299
2-Methylanthracene	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
2-Methylnaphthalene	< 0.30	477	118.00	34000	427	107.00	31000	443	116.00	32200	113	< 32400
3-Methylcholanthrene	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
7,12-Dimethylbenzo(a)anthracene	< 1.2	< 1.2	< 0.30	< 85.6	< 1.2	< 0.30	< 87.1	< 1.2	< 0.31	< 87.3	< 0.303	< 86.7
9,10-Dimethylanthracene	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
9-Methylphenanthrene	< 0.30	4.20	1.04	300	1.86	0.46	135	1.08	0.28	78.6	0.60	< 171
Acenaphthene	< 0.30	4.92	1.22	351	4.74	1.18	344	4.56	1.19	332	1.20	< 342
Acenaphthylene	< 0.30	6.96	1.72	497	5.70	1.42	414	6.42	1.68	467	1.61	< 459
Anthracene	< 0.30	0.48	0.12	34.3	0.30	0.07	21.8	< 0.30	< 0.08	< 21.8	< 0.0906	< 26.0
Benzo(a)anthracene	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
Benzo(a)fluorene	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
Benzo(a)pyrene	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
Benzo(b)fluoranthene	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
Benzo(b)fluorene	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
Benzo(e)pyrene	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
Benzo(g,h,i)perylene	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
Benzo(k)fluoranthene	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
Chrysene	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
Coronene	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
Dibenzo(a,c)anthracene	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
Fluoranthene	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
Fluorene	< 0.30	3.42	0.85	244	2.28	0.57	165	2.10	0.55	153	0.654	< 187
Indeno(1,2,3-cd)pyrene	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.076	< 21.7
Naphthalene	< 0.30	590	146.00	42100	658	164.00	47700	802	210.00	58400	173	< 49400
Perylene	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
Phenanthrene	< 0.30	16.1	3.98	1150	8.64	2.16	627	6.66	1.74	485	2.63	< 754
Picene	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
Pyrene	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
Tetralin	< 0.30	187	46.20	13300	177	44.20	12800	192	50.20	14000	46.90	< 13400
Triphenylene	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
1,2,3,4-Tetrachlorobenzene	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
1,2,3,5+1,2,4,5-Tetrachlorobenzene	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
1,2,3-Trichlorobenzene	< 0.30	1.13	0.28	80.6	0.83	0.21	60.2	2.17	0.57	158	0.351	< 99.6
1,2,4-Trichlorobenzene	< 0.30	1.91	0.47	136	1.45	0.36	105	1.37	0.36	99.7	0.397	< 114
1,2-Dichlorobenzene	< 0.30	5.32	1.31	380	4.30	1.07	312	5.31	1.39	386	1.26	< 359
1,3,5-Trichlorobenzene	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
1,3-Dichlorobenzene	< 0.30	2.40	0.59	171	1.88	0.47	136	2.80	0.73	204	0.598	< 170
1,4-Dichlorobenzene	< 0.30	3.49	0.86	249	2.13	0.53	155	2.66	0.70	194	0.697	< 199
Hexachlorobenzene	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
Pentachlorobenzene	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
2,3,4,5-Tetrachlorophenol	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
2,3,4,6-Tetrachlorophenol	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
2,3,4-Trichlorophenol	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
2,3,5,6-Tetrachlorophenol	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
2,3,5-Trichlorophenol	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
2,3,6-Trichlorophenol	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
2,3-Dichlorophenol	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
2,4 + 2,5-Dichlorophenol	< 0.30	0.57	0.14	40.7	0.43	0.11	31.2	0.45	0.12	32.8	0.122	< 34.9
2,4,5-Trichlorophenol	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
2,4,6-Trichlorophenol	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
2,6-Dichlorophenol	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
2-Chlorophenol	< 0.30	22.9	5.66	1630	15.9	3.97	1150	20.6	5.39	1500	5.00	< 1430
3,4,5-Trichlorophenol	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
3,4-Dichlorophenol	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7
3,5-Dichlorophenol	< 0.30	0.41	0.10	29.3	0.31	0.08	22.5	< 0.30	< 0.08	< 21.8	< 0.0857	< 24.5
3-Chlorophenol	< 0.30	2.90	0.72	207	1.98	0.49	144	1.98	0.52	144	0.576	< 165
4-Chlorophenol	< 0.30	2.60	0.64	186	1.42	0.35	103	1.43	0.37	104	0.457	< 131
Pentachlorophenol	< 0.30	< 0.30	< 0.07	< 21.4	< 0.30	< 0.07	< 21.8	< 0.30	< 0.08	< 21.8	< 0.0758	< 21.7

Notes:

[1] Sample volume and volumetric flow rate based on dry referenced conditions (101.3kPa, and 25 °C)

'<' indicates that laboratory results were below the detection limit. The detection limit was used to calculate the concentration and emission rate.

Concentration and Emission Rate has been reported to 3 significant figures.

Sampling Results - Dioxins and Furans

Source: Main Stack

Test :	Blank	Test #1			Test #2			Test #3			Average Concentration	Average Concentration @25 °C and 11 % O_2	Reg 419 Toxic Equivalency Factors		
													TEF	TEF Concentration	TEF Emission Rate
Sample Volume (m^3) [1] :		4.05			4.01			3.82							
Stack Flow Rate (m^3/s) [1] :		288.7			290.8			278.3							
	(pg)	**(pg)**	**(pg/m^3)**	**(pg/s)**	**(pg)**	**(pg/m^3)**	**(pg/s)**	**(pg)**	**(pg/m^3)**	**(pg/s)**	**(pg/m^3)**	**(pg/m^3)**		**(pg TEQ/m^3)**	**(pg/s)**
2,3,7,8-Tetra CDD *	< 6.3	< 6.9	< 1.71	< 492	< 6.4	< 1.6	< 464	< 6.2	< 1.62	< 451	1.6	2.15	1	2.15	465
1,2,3,7,8-Penta CDD *	< 6.8	< 6.7	< 1.66	< 478	< 6.8	< 1.7	< 493	< 6.9	< 1.8	< 502	1.7	2.25	1	2.25	487
1,2,3,4,7,8-Hexa CDD *	< 6.7	< 6.1	< 1.5	< 435	< 6.4	< 1.6	< 464	< 7.1	< 1.86	< 517	1.7	2.16	0.1	0.216	46.8
1,2,3,6,7,8-Hexa CDD *	< 6.8	< 6.2	< 1.53	< 442	< 6.5	< 1.62	< 472	7.6	1.99	553	1.71	2.24	0.1	0.224	48.4
1,2,3,7,8,9-Hexa CDD *	< 6.2	< 5.7	< 1.41	< 407	< 6.0	< 1.5	< 435	< 6.6	< 1.73	< 480	1.54	2.01	0.1	0.201	43.6
1,2,3,4,6,7,8-Hepta CDD *	< 6.4	< 6.2	< 1.53	< 442	< 7.0	< 1.75	< 508	10.7	2.8	779	2.03	2.66	0.01	0.0266	5.75
1,2,3,4,6,7,8,9-Octa CDD *	8.6	19.8	4.89	1410	8.8	2.2	638	47.2	12.3	3440	6.48	8.48	0.0003	0.00254	0.550
2,3,7,8-Tetra CDF **	< 6.4	8.1	2.0	578	7.5	1.87	544	8.4	2.2	611	2.0	2.64	0.1	0.264	57.2
1,2,3,7,8-Penta CDF **	< 7.1	< 6.2	< 1.53	< 442	< 6.4	< 1.6	< 464	9.8	2.56	713	1.9	2.49	0.03	0.0746	16.1
2,3,4,7,8-Penta CDF **	< 7.1	< 6.2	< 1.5	< 442	< 6.4	< 1.6	< 464	7.2	1.88	524	1.7	2.18	0.3	0.655	142
1,2,3,4,7,8-Hexa CDF **	< 6.0	< 5.9	< 1.5	< 421	< 6.0	< 1.5	< 435	7.5	1.96	546	1.64	2.15	0.1	0.215	46.4
1,2,3,6,7,8-Hexa CDF **	< 5.9	< 5.9	< 1.46	< 421	< 5.9	< 1.47	< 428	7.4	1.94	539	1.62	2.12	0.1	0.212	45.9
2,3,4,6,7,8-Hexa CDF **	< 6.3	< 6.2	< 1.53	< 442	< 6.3	< 1.57	< 457	< 6.2	< 1.62	< 451	1.58	2.07	0.1	0.207	44.7
1,2,3,7,8,9-Hexa CDF **	< 6.9	< 6.8	< 1.68	< 485	< 6.9	< 1.72	< 501	9.5	2.48	691	1.96	2.56	0.1	0.256	55.5
1,2,3,4,6,7,8-Hepta CDF **	< 5.9	< 7.8	< 1.9	< 557	< 5.5	< 1.37	< 399	8.2	2.14	597	1.81	2.37	0.01	0.0237	5.13
1,2,3,4,7,8,9-Hepta CDF **	< 7.3	< 6.8	< 1.68	< 485	< 6.8	< 1.7	< 493	< 7.3	< 1.91	< 531	1.76	2.30	0.01	0.023	4.98
1,2,3,4,6,7,8,9-Octa CDF **	< 6.6	< 7.1	< 1.8	< 507	< 6.1	< 1.52	< 443	13.0	3.4	946	2.23	2.92	0.0003	0.000875	0.189
33'44'-TetraCB-(77)	< 31	100	24.7	7140	< 66	< 16.5	< 4790	< 49	< 12.8	< 3570	18	23.55	0.0001	0.00236	0.510
344'5-TetraCB-(81)	< 30	< 57	< 14.1	< 4070	< 64	< 16	< 4640	< 48	< 12.6	< 3490	14.2	18.58	0.0003	0.00557	1.21
233'44'-PentaCB-(105)	< 18	320	79.1	22800	160	39.9	11600	58	15.2	4220	44.7	58.48	0.00003	0.00175	0.380
2344'5-PentaCB-(114)	< 18	< 35	< 8.7	< 2500	< 37	< 9.23	< 2680	< 23	< 6.01	< 1670	7.97	10.43	0.00003	0.000313	0.0677
23'44'5-PentaCB-(118)	45	1000	247.0	71400	430	107	31200	170	44.5	12400	133	174.01	0.00003	0.00522	1.13
23'44'5'-PentaCB-(123)	< 20	< 39	< 9.6	< 2780	< 41	< 10.2	< 2970	< 25	< 6.54	< 1820	8.8	11.51	0.00003	0.000345	0.0748
33'44'5-PentaCB-(126)	< 17	< 33	< 8.2	< 2360	< 35	< 8.73	< 2540	< 22	< 5.75	< 1600	7.55	9.88	0.1	0.988	214
HexaCB-(156)+(157)	< 32	110	27.2	7850	< 100	< 25	< 7250	< 59	< 15.4	< 4290	22.5	29.44	0.00003	0.000883	0.191
23'44'55'-HexaCB-(167)	< 30	< 48	< 11.9	< 3430	< 99	< 24.7	< 7180	< 57	< 14.9	< 4150	17.2	22.50	0.00003	0.000675	0.146
33'44'55'-HexaCB-(169)	< 32	< 51	< 12.6	< 3640	< 110	< 27.4	< 7980	< 61	< 16	< 4440	18.7	24.47	0.03	0.734	159
233'44'55'-HeptaCB-(189)	< 66	< 65	< 16.1	< 4640	< 120	< 29.9	< 8710	< 53	< 13.9	< 3860	20	26.17	0.00003	0.000785	0.170
												Total Toxic Equivalency →		8.74	1890

Notes :

[1] Sample volume and volumetric flow rate based on dry referenced conditions (101.3 kPa and 25°C)

'<' indicates that laboratory results were below the Reportable Detection Limit (RDL) This detection limit was used to calculate the concentration and emission rate.

Concentration and Emission Rate has been reported to 3 significant figures.

*CDD = chlorodibenzo-*p*-dioxin

**CDF = chlorodibenzo-*p*-furan

***CB = chlorobenzene

Semi-Volatile Organic Compounds Sampling

Alt Fuels: SVOC, December

Facility: St. Mary's			**Operator:** DO		
City: Bowmanville, ON			**Entered by:** TFL		
Source: Main Stack Alt Fuels			**Checked by:** DO		
Reference Method: Environment Canada 1/RM/2					

DATA INPUTS	**Symbol**	**Units**	**Test #1** SVOC	**Test #2** SVOC	**Test #3** SVOC
Date			4-Dec-18	5-Dec-18	6-Dec-18
Start Time			1:02 PM	9:05 AM	9:08 AM
End Time			6:20 PM	1:30 PM	1:30 PM
Round Stack, Diameter (Inside)	d_s	in	216	216	216
Standard Temperature	T_s	°F	77	77	77
Standard Pressure	P_s	" Hg	29.9	29.9	29.9
Nozzle Diameter	D_n	in	0.212	0.212	0.212
Average Stack Temperature	T_s	°F	259	251	247
Average Meter Temperature	T_m	°F	51	56	38
Barometric Pressure	P_{bar}	" Hg	29.6	29.5	29.5
Stack Static Pressure	P_g	" H_2O	-0.17	-0.17	-0.17
Average Delta H	dH	" H_2O	1.11	1.14	1.01
Average Velocity Head	dP_{rms}	" H_2O	0.83	0.84	0.77
Pitot Coefficient	C_p	-	0.824	0.824	0.824
	Pitot ID ->		RWDI 7' #1		
Gas Sample Volume	V_m	ft³	138.77	139.31	128.19
DGM Calibration Factor	Y	-	0.998	0.998	0.998
	DGM ID ->		Console E		
Total Sampling Time	min	min	240	240	240
Stack Gas Oxygen Concentration	O_2	%	13.2	13.3	13.5
Stack Gas Carbon Dioxide Concentration	CO_2	%	10.9	11.0	10.8
Impinger Gain	W_w	g	208.3	216.8	215.1

Semi-Volatile Organic Compounds Sampling

Facility: St. Mary's	**Operator:** DO
City: Bowmanville, ON	**Entered by:** TFL
Source: Main Stack Alt Fuels	**Checked by:**
Reference Method: Environment Canada 1/RM/2	

Emissions Calculations	**Symbol**	**Units**	**Test #1** SVOC	**Test #2** SVOC	**Test #3** SVOC	**AVERAGE**
Nozzle Area	A_n	ft²	0.00025	0.00025	0.00025	
Stack Area	A_s	ft²	254.47	254.47	254.47	
Average Stack Temperature	T_s	°R	719	711	707	713
Average DGM Temperature	T_m	°R	1	516	498	
Sample Volume at Reference Conditions	V_{mStd}	ft³	142.96	141.63	135.12	
	$\mathbf{V_{mmstd}}$	**m³**	**4.05**	**4.01**	**3.82**	
Vol. of Water Vapour	V_{wStd}	ft³	9.9984	10.4064	10.3248	
Water Fraction	B_{ws}		6.5%	6.8%	7.1%	6.8%
Molecular Weight, dry	M_d	g/mole	30.38	30.40	30.37	30.38
Molecular Weight, wet	M_w	g/mole	29.57	29.55	29.50	29.54
Absolute Stack Pressure	P_s	" Hg	29.59	29.49	29.49	29.52
Stack Gas Velocity	U_s	ft/s	58.06	58.23	55.57	57.29
	$\mathbf{U_{sm}}$	**m/s**	**17.70**	**17.75**	**16.94**	**17.46**
Actual Gas Flow Rate	Q_{act}	acf/min	886,528	889,014	848,448	874,664
Dry Gas Flow Rate (dry, ref)	Q_{ref}	dscf/min	611,931	616,251	589,872	606,018
	Q_{Rm}	m³/min	17324	17446	16699	17,156
	Qmref (Actual O_2)	**m³/s**	**288.73**	**290.77**	**278.32**	**285.9**
	Qmref (11% O_2)	**m³/sec**	**222.3**	**221.0**	**206.0**	**216.4**
Isokinetic Rate	I	%	101	99	99	100

Semi-Volatile Organic Compounds Sampling

Facility: St. Mary's
City: Bowmanville, ON
Source: Main Stack Alt Fuels
Reference Method: Environment Canada 1/RM/2
Run: Test 1

Operator: JDF
Entered by: TFL
Checked by: DO
Test Date: 4-Dec-18

Point	Time (min)	Velocity Pressure (" H_2O)	Orifice Pressure (" H_2O)	Meter Volume (ft^3)	Stack Temp (^oF)	Probe Temp (^oF)	Box Temp (^oF)	Imp Temp (^oF)	Meter Temp (^oF)	XAD Trap (^oF)	Vacuum Pressure (" Hg)	Percentage Isokinetic (%)	Stack Velocity (ft/s)
Traverse 1- East													
Pre-Test Leak Check =		<0.02 at 12" Hg											
1	0	0.90	1.10	854.65	254	250	250	27	46	23	-	110	60.27
	2.5	0.90	1.10	856.27	256	250	246	23	47	30	-3	93	60.36
	5	0.90	1.10	857.65	248	250	249	23	49	36	-3	93	60.02
2	7.5	0.90	1.00	859.04	256	249	251	25	50	30	-3	99	60.36
	10	0.90	1.00	860.52	256	255	251	24	51	32	-3	98	60.36
	12.5	0.90	1.30	861.99	256	249	251	25	52	40	-3	98	60.36
3	15	0.95	1.30	863.45	259	251	250	25	53	40	-3	101	62.14
	17.5	0.95	1.30	865.00	261	247	252	26	54	40	-3	101	62.23
	20	0.95	1.30	866.55	260	245	248	26	55	40	-3	101	62.18
4	22.5	0.95	1.30	868.10	260	249	249	26	55	42	-3	101	62.18
	25	0.95	1.30	869.66	259	250	250	27	56	40	-3	102	62.14
	27.5	0.95	1.30	871.23	260	250	250	27	56	40	-3	100	62.18
5	30	0.90	1.20	872.78	260	250	250	27	56	40	-3	102	60.53
	32.5	0.90	1.20	874.31	260	250	251	28	58	43	-3	101	60.53
	35	0.90	1.20	875.83	262	250	251	28	58	42	-5	100	60.61
6	37.5	0.85	1.10	877.33	262	250	251	29	58	42	-5	100	58.90
	40	0.85	1.10	878.79	261	250	251	29	58	42	-5	102	58.86
	42.5	0.85	1.10	880.28	260	243	250	31	59	42	-5	101	58.82
7	45	0.85	1.10	881.76	259	248	251	31	59	41	-5	99	58.78
	47.5	0.85	1.10	883.22	228	248	251	31	59	41	-5	97	57.50
	50	0.75	1.00	884.67	255	247	241	32	58	40	-5	102	55.06
8	52.5	0.75	1.00	886.08	256	247	241	32	58	40	-5	102	55.10
	55	0.75	1.00	887.49	250	247	250	40	59	40	-5	101	54.87
	57.5	0.75	1.00	888.89	250	247	250	40	59	40	-5	100	54.87
	60	-	-	890.28	-	-	-	-	-	-	-5	-	-
Traverse 2 - North													
1	0	0.75	1.00	890.28	254	247	251	40	59	40	-5	102	55.02
	2.5	0.75	1.00	891.69	260	248	250	35	57	39	-5	101	55.25
	5	0.75	1.00	893.08	260	242	250	32	56	39	-5	103	55.25
2	7.5	0.75	1.00	894.49	260	258	249	32	55	36	-5	101	55.25
	10	0.75	1.00	895.88	260	249	251	33	55	38	-5	101	55.25
	12.5	0.75	1.00	897.26	261	251	250	33	55	38	-5	100	55.29
3	15	0.85	1.10	898.63	260	255	250	33	55	37	-5	98	58.82
	17.5	0.85	1.10	900.06	260	258	251	33	56	38	-5	99	58.82
	20	0.85	1.10	901.50	260	258	251	33	56	38	-5	97	58.82
4	22.5	0.85	1.10	902.91	260	258	251	33	56	38	-5	98	58.82
	25	0.85	1.10	904.34	262	251	251	33	56	36	-5	98	58.90
	27.5	0.85	1.10	905.77	261	252	250	34	56	39	-5	115	58.86
5	30	0.85	1.10	907.45	261	243	250	34	46	33	-4	114	58.86
	32.5	0.85	1.10	909.08	260	227	250	34	46	33	-4	76	58.82
	35	0.85	1.10	910.17	260	220	250	34	45	33	-4	100	58.82
6	37.5	0.85	1.10	911.60	260	223	248	30	49	39	-4	101	58.82
	40	0.85	1.10	913.06	260	253	241	30	49	35	-4	108	58.82
	42.5	0.85	1.10	914.61	260	241	250	29	49	35	-4	100	58.82
7	45	0.85	1.10	916.05	260	247	250	30	48	39	-4	102	58.82
	47.5	0.85	1.10	917.52	250	250	250	30	48	39	-4	99	58.41
	50	0.85	1.10	918.95	260	261	238	30	48	39	-4	100	58.82
8	52.5	0.85	1.10	920.39	260	261	238	30	48	39	-4	103	58.82
	55	0.85	1.10	921.87	260	241	253	33	56	40	-4	100	58.82
	57.5	0.85	1.10	923.33	261	238	250	33	52	40	-5	100	58.86
	60			924.78									
Traverse 3 - West													
1	0	0.90	1.10	924.81	260	251	251	31	47	19	-	98	60.53
	2.5	0.90	1.20	926.25	260	241	251	31	49	33	-4	101	60.53
	5	0.90	1.20	927.74	262	249	246	39	48	38	-4	98	60.61
2	7.5	0.90	1.20	929.19	263	243	249	32	48	38	-5	101	60.65
	10	0.90	1.20	930.68	263	241	249	31	48	36	-5	102	60.65
	12.5	0.90	1.20	932.18	261	244	249	32	48	39	-5	101	60.57
3	15	0.90	1.20	933.67	262	242	250	32	48	39	-5	101	60.61
	17.5	0.90	1.20	935.16	262	248	249	33	47	39	-5	101	60.61
	20	0.90	1.20	936.65	260	250	249	33	51	39	-5	101	60.53
4	22.5	0.85	1.10	938.15	260	250	250	33	49	39	-5	103	58.82
	25	0.85	1.10	939.64	262	248	249	33	50	44	-5	101	58.90
	27.5	0.85	1.10	941.10	262	248	250	33	50	44	-5	101	58.90
5	30	0.85	1.10	942.56	262	250	250	32	50	44	-5	102	58.90
	32.5	0.85	1.10	944.03	262	250	250	32	50	44	-5	103	58.90
	35	0.85	1.10	945.52	262	250	250	32	50	44	-5	101	58.90
6	37.5	0.85	1.10	946.98	262	246	250	32	50	45	-5	101	58.90
	40	0.75	1.00	948.43	262	251	251	35	50	39	-5	104	55.33
	42.5	0.75	1.00	949.84	261	251	234	35	50	39	-5	101	55.29
7	45	0.75	1.00	951.21	260	236	249	35	50	39	-5	104	55.25
	47.5	0.75	1.00	952.62	261	240	246	34	50	39	-5	100	55.29
	50	0.75	1.00	953.98	261	245	251	33	50	39	-5	103	55.29
8	52.5	0.75	1.00	955.38	261	250	250	33	50	38	-5	102	55.29
	55	0.75	1.00	956.76	260	250	250	33	50	38	-5	103	55.25
	57.5	0.75	1.00	958.15	260	244	251	32	49	40	-5	102	55.25
	60			959.53									
Traverse 4- East													
1	0	0.75	1.00	959.53	260	251	251	32	49	37	-	100	55.25
	2.5	0.75	1.00	960.89	261	255	248	32	49	37	-4	104	55.29
	5	0.75	1.00	962.30	260	251	249	31	49	37	-4	101	55.25
2	7.5	0.75	1.00	963.66	260	251	249	31	49	38	-4	105	55.25
	10	0.75	1.00	965.08	261	225	248	31	49	38	-4	104	55.29
	12.5	0.75	1.00	966.48	259	226	248	31	48	40	-4	101	55.21
3	15	0.75	1.00	967.84	259	226	248	31	48	40	-4	102	55.21
	17.5	0.75	1.00	969.22	259	224	247	31	48	40	-4	103	55.21
	20	0.75	1.00	970.61	259	224	248	31	47	41	-4	103	55.21
4	22.5	0.72	1.00	972.00	259	235	248	31	47	41	-4	101	54.10
	25	0.72	1.00	973.33	260	233	247	31	47	41	-4	101	54.14
	27.5	0.72	1.00	974.67	260	235	247	31	47	41	-4	103	54.14
5	30	0.76	1.10	976.03	262	233	246	31	47	41	-4	103	55.70
	32.5	0.76	1.10	977.42	261	232	244	31	47	41	-4	102	55.66
	35	0.76	1.10	978.81	260	231	248	31	47	41	-4	102	55.62
6	37.5	0.81	1.20	980.19	260	230	249	31	47	40	-4	103	57.42
	40	0.81	1.20	981.63	259	230	248	31	47	40	-4	103	57.38
	42.5	0.81	1.20	983.08	258	231	250	31	47	40	-4	101	57.34
7	45	0.87	1.30	984.50	258	230	250	31	47	40	-4	105	59.43
	47.5	0.87	1.30	986.02	258	230	250	31	47	43	-4	103	59.43
	50	0.87	1.30	987.52	258	230	249	31	47	43	-4	102	59.43
8	52.5	0.87	1.30	989.01	258	230	249	31	47	43	-5	101	59.43
	55	0.87	1.30	990.48	260	230	248	31	47	43	-5	103	59.51
	57.5	0.87	1.30	991.97	258	231	250	31	47	43	-5	102	59.43
	60			993.45									
Post-Test Leak Check =		<0.02 at 12" Hg											
	Average	0.83	1.11	138.77	259.13	244.02	248.86	31.25	50.95	38.85	-4.30	101.13	58.06

Semi-Volatile Organic Compounds Sampling

Facility:	St. Mary's	Operator:	JDF
City:	Bowmanville, ON	Entered by:	TFL
Source:	Main Stack Alt Fuels	Checked by:	DO
Reference Method:	Environment Canada 1/RM/2	Test Date:	5-Dec-18
Run:	Test 2		

Point	Time (min)	Velocity Pressure (" H_2O)	Orifice Pressure (" H_2O)	Meter Volume (ft^3)	Stack Temp (^oF)	Probe Temp (^oF)	Box Temp (^oF)	Imp Temp (^oF)	Meter Temp (^oF)	XAD Trap (^oF)	Vacuum Pressure (" Hg)	Percentage Isokinetic (%)	Stack Velocity (ft/s)
Traverse 1- East													
Pre-Test Leak Check =	<0.02 at 15" Hg												
1	0	0.90	1.20	994.00	256	250	249	25	33	27	-	101	60.48
	2.5	0.90	1.20	995.45	254	259	246	26	35	55	-1	95	60.40
	5	0.90	1.20	996.83	253	259	256	27	43	60	-1	95	60.35
2	7.5	0.90	1.20	998.23	255	268	259	26	43	60	-1	97	60.44
	10	0.90	1.20	999.65	254	261	251	29	44	61	-1	101	60.40
	12.5	0.90	1.20	1001.13	254	245	249	29	44	61	-1	103	60.40
3	15	0.90	1.20	1002.64	256	253	246	30	44	61	-1	102	60.48
	17.5	0.90	1.20	1004.14	255	249	230	31	44	61	-1	102	60.44
	20	0.90	1.20	1005.64	255	245	231	31	42	61	-1	102	60.44
4	22.5	0.90	1.20	1007.13	255	245	231	31	42	61	-1	102	60.44
	25	0.90	1.20	1008.62	255	241	240	32	42	60	-1	101	60.44
	27.5	0.90	1.20	1010.10	255	237	240	32	43	60	-1	101	60.44
5	30	0.80	1.10	1011.59	255	237	241	32	44	60	-1	100	56.98
	32.5	0.80	1.10	1012.98	255	237	245	31	44	59	-1	98	56.98
	35	0.80	1.10	1014.34	259	237	251	31	44	59	-1	99	57.14
6	37.5	0.85	1.15	1015.71	256	231	229	32	44	60	-1	98	58.78
	40	0.85	1.15	1017.11	257	232	220	32	44	60	-1	99	58.82
	42.5	0.85	1.15	1018.52	256	239	249	32	45	60	-1	101	58.78
7	45	0.85	1.15	1019.96	256	240	241	32	45	60	-1	94	58.78
	47.5	0.75	0.95	1021.30	251	240	240	32	45	60	-1	97	55.02
	50	0.75	1.00	1022.61	251	236	242	32	45	61	-1	98	55.02
8	52.5	0.75	1.00	1023.93	251	236	241	32	45	60	-1	101	55.02
	55	0.75	1.00	1025.30	251	230	239	32	45	60	-1	101	55.02
	57.5	0.75	1.00	1026.66	250	234	238	32	45	60	-1	103	54.98
	60			1028.05									
Traverse 2 - North													
1	0	0.75	1.00	1028.05	251	240	245	32	45	60	-	104	55.02
	2.5	0.75	1.00	1029.45	250	240	230	33	49	61	-2	99	54.98
	5	0.75	1.00	1030.80	251	240	233	35	50	60	-2	104	55.02
2	7.5	0.75	1.00	1032.22	250	239	234	36	51	60	-2	100	54.98
	10	0.75	1.00	1033.59	252	241	245	35	52	40	-2	107	55.06
	12.5	0.75	1.00	1035.06	252	240	242	36	52	40	-2	105	55.06
3	15	0.90	1.20	1036.50	252	240	245	36	53	38	-2	97	60.31
	17.5	0.90	1.20	1037.95	252	241	245	36	53	37	-2	99	60.31
	20	0.90	1.20	1039.43	259	243	237	36	53	37	-2	100	60.61
4	22.5	0.90	1.20	1040.92	260	246	237	37	55	40	-2	99	60.65
	25	0.90	1.20	1042.40	257	245	239	36	55	45	-2	100	60.52
	27.5	0.90	1.20	1043.90	257	239	239	38	56	45	-2	101	60.52
5	30	0.93	1.25	1045.42	257	248	242	38	56	44	-2	97	61.52
	32.5	0.93	1.25	1046.90	258	249	245	38	56	42	-2	100	61.57
	35	0.93	1.25	1048.43	251	250	254	38	56	42	0	102	61.26
6	37.5	0.93	1.25	1050.00	257	247	243	40	58	42	0	102	61.52
	40	0.93	1.25	1051.56	257	241	247	40	58	42	0	97	61.52
	42.5	0.93	1.25	1053.05	251	245	241	40	58	42	0	100	61.26
7	45	0.93	1.25	1054.59	250	247	245	41	58	45	0	101	61.22
	47.5	0.93	1.25	1056.15	250	247	245	41	58	45	0	65	61.22
	50	0.93	1.25	1057.15	250	249	241	41	58	44	0	131	61.22
8	52.5	0.93	1.25	1059.17	250	249	241	41	58	44	0	99	61.22
	55	0.93	1.25	1060.70	250	250	251	43	58	44	0	99	61.22
	57.5	0.93	1.21	1062.23	257	243	249	43	57	44	0	100	61.52
	60			1063.76									
Traverse 3 - West													
1	0	0.90	1.20	1063.78	250	250	246	38	56	39	-	99	60.23
	2.5	0.90	1.20	1065.28	258	251	249	38	56	40	-3	104	60.56
	5	0.90	1.20	1066.84	251	250	249	37	56	40	-3	97	60.27
2	7.5	0.90	1.20	1068.30	251	250	251	38	56	41	-3	101	60.27
	10	0.90	1.20	1069.82	254	251	251	38	56	41	-3	102	60.40
	12.5	0.90	1.20	1071.35	252	249	245	43	60	41	-3	98	60.31
3	15	0.90	1.20	1072.84	254	249	234	48	61	41	-3	99	60.40
	17.5	0.90	1.20	1074.35	251	249	241	48	58	45	-3	100	60.27
	20	0.85	1.15	1075.86	252	249	242	48	58	47	-3	101	58.61
4	22.5	0.85	1.15	1077.35	250	250	249	45	61	54	-3	100	58.53
	25	0.85	1.15	1078.84	251	255	231	45	63	54	-3	100	58.57
	27.5	0.85	1.15	1080.33	251	232	242	45	64	54	-3	100	58.57
5	30	0.85	1.15	1081.82	251	234	242	45	65	54	-3	100	58.57
	32.5	0.85	1.15	1083.31	250	242	241	45	65	54	-3	100	58.53
	35	0.85	1.15	1084.80	253	241	241	45	65	54	-3	101	58.65
6	37.5	0.80	1.10	1086.30	254	242	248	45	65	54	-3	102	56.94
	40	0.80	1.10	1087.77	249	232	247	44	66	54	-3	102	56.74
	42.5	0.80	1.10	1089.26	249	235	239	44	66	54	-3	101	56.74
7	45	0.75	1.00	1090.73	251	241	241	44	66	54	-3	101	55.02
	47.5	0.75	1.00	1092.15	251	241	245	44	66	53	-3	101	55.02
	50	0.75	1.00	1093.57	249	232	235	44	68	53	-3	101	54.94
8	52.5	0.75	1.00	1094.99	249	244	238	44	68	53	-3	100	54.94
	55	0.75	1.00	1096.40	249	245	239	44	68	52	-3	100	54.94
	57.5	0.75	1.00	1097.81	250	248	239	44	68	52	-3	101	54.98
	60			1099.23									
Traverse 4- South													
1	0	0.88	1.20	1099.23	247	224	252	42	63	52	-	101	59.43
	2.5	0.88	1.20	1100.76	247	228	252	43	66	55	-3	96	59.43
	5	0.86	1.20	1102.22	247	224	250	43	66	55	-3	97	58.75
2	7.5	0.86	1.20	1103.68	247	222	252	43	66	55	-3	96	58.75
	10	0.86	1.20	1105.13	247	224	246	45	66	53	-3	94	58.75
	12.5	0.86	1.20	1106.55	248	224	249	45	66	53	-3	98	58.79
3	15	0.86	1.20	1108.03	247	227	249	45	66	53	-3	94	58.75
	17.5	0.86	1.20	1109.45	247	227	249	45	66	53	-3	101	58.75
	20	0.86	1.20	1110.97	245	234	250	45	66	53	-3	93	58.66
4	22.5	0.90	1.30	1112.38	246	247	250	45	66	50	-3	96	60.06
	25	0.90	1.30	1113.87	246	234	244	44	65	50	-3	98	60.06
	27.5	0.90	1.30	1115.38	245	226	251	44	65	50	-3	96	60.01
5	30	0.82	1.10	1116.86	246	227	244	44	65	50	-3	98	57.32
	32.5	0.82	1.10	1118.30	247	231	244	44	65	48	-3	99	57.37
	35	0.82	1.10	1119.75	247	228	251	44	65	48	-3	97	57.37
6	37.5	0.82	1.10	1121.18	246	228	250	44	65	48	-3	99	57.32
	40	0.75	1.05	1122.64	246	225	250	43	64	48	-3	98	54.82
	42.5	0.75	1.05	1124.02	246	224	249	43	64	48	-3	98	54.82
7	45	0.75	1.05	1125.40	247	232	250	43	64	48	-3	100	54.86
	47.5	0.66	0.95	1126.80	246	233	250	43	64	48	-3	101	51.43
	50	0.66	0.95	1128.13	246	233	250	43	64	48	-3	97	51.43
8	52.5	0.66	0.95	1129.41	244	233	245	41	63	46	-3	99	51.36
	55	0.66	0.95	1130.72	245	227	245	41	63	46	-3	101	51.39
	57.5	0.66	0.95	1132.05	245	222	245	41	63	46	-3	97	51.39
	60			1133.33									
Post-Test Leak Check =	<0.01 at 11" Hg												
	Average	0.84	1.14	139.31	251.31	240.06	243.86	38.82	56.08	50.75	-2.00	99.47	58.23

Semi-Volatile Organic Compounds Sampling

Facility: St. Mary's
City: Bowmanville, ON
Source: Main Stack Alt Fuels
Reference Method: Environment Canada 1/RM/2
Run: Test 3
Operator: JDF
Entered by: TFL
Checked by: DO
Test Date: 6-Dec-18

Point	Time (min)	Velocity Pressure (" H_2O)	Orifice Pressure (" H_2O)	Meter Volume (ft^3)	Stack Temp (^oF)	Probe Temp (^oF)	Box Temp (^oF)	Imp Temp (^oF)	Meter Temp (^oF)	XAD Trap (^oF)	Flex Line (^oF)	Vacuum Pressure (" Hg)	Percentage Isokinetic (%)	Stack Velocity (ft/sec)
Traverse 1- West														
Pre-test Leak Check =		<0.01 at 12" Hg												
1	0	0.85	1.10	134.04	255	260	234	29	32	36	250	-	103	58.79
	2.5	0.85	1.10	135.48	254	255	237	30	34	36	250	-1	100	58.75
	5	0.85	1.10	136.88	255	251	237	30	34	36	250	-1	95	58.79
2	7.5	0.85	1.10	138.21	255	251	237	31	34	36	250	-1	87	58.79
	10	0.85	1.10	139.43	254	246	233	33	34	36	250	-1	101	58.75
	12.5	0.85	1.10	140.85	253	250	237	31	34	37	251	-1	101	58.71
3	15	0.85	1.10	142.27	253	250	237	31	34	37	252	-1	99	58.71
	17.5	0.85	1.10	143.66	253	250	249	31	34	37	250	-1	99	58.71
	20	0.8	1.00	145.05	254	259	232	31	35	38	248	-1	101	56.99
4	22.5	0.8	1.00	146.43	253	258	237	32	35	38	250	-2	98	56.95
	25	0.8	1.00	147.77	254	251	248	32	35	38	250	-2	101	56.99
	27.5	0.8	1.00	149.14	251	251	248	32	35	38	250	-2	99	56.87
5	30	0.8	1.00	150.49	255	258	239	32	36	38	251	-3	99	57.03
	32.5	0.8	1.00	151.84	255	255	232	32	36	38	250	-3	98	57.03
	35	0.8	1.00	153.18	253	251	248	32	36	39	250	-3	100	56.95
6	37.5	0.85	1.10	154.54	252	251	248	32	36	39	252	-3	100	58.66
	40	0.85	1.10	155.94	256	259	248	33	37	40	249	-3	99	58.83
	42.5	0.85	1.10	157.34	250	259	248	33	37	40	249	-3	102	58.58
7	45	0.85	1.10	158.78	257	252	254	33	37	40	248	-3	100	58.87
	47.5	0.85	1.10	160.19	257	252	254	33	37	40	248	-3	102	58.87
	50	0.7	0.93	161.62	256	253	236	33	37	40	251	-3	100	53.39
8	52.5	0.7	0.95	162.90	255	252	236	34	37	40	248	-3	92	53.35
	55	0.7	0.95	164.07	254	255	239	33	37	40	250	-3	106	53.31
	57.5	0.7	0.95	165.42	252	251	248	33	37	40	250	-3	113	53.24
	60			166.87										
Traverse 2- North														
1	0	0.7	0.95	166.87	246	236	245	33	40	40	250	-	103	53.01
	2.5	0.69	0.93	168.20	244	225	236	32	37	32	250	-3	99	52.56
	5	0.69	0.93	169.46	244	225	232	32	40	32	250	-3	97	52.56
2	7.5	0.69	0.93	170.71	242	225	238	32	40	39	250	-3	98	52.48
	10	0.69	0.93	171.97	243	226	230	32	38	39	250	-3	99	52.52
	12.5	0.69	0.93	173.24	243	226	230	32	38	39	250	-3	94	52.52
3	15	0.73	0.96	174.45	244	226	225	32	38	39	250	-3	100	54.06
	17.5	0.73	0.96	175.77	243	228	232	32	38	39	251	-3	96	54.02
	20	0.73	0.96	177.03	244	229	232	34	37	41	250	-3	99	54.06
4	22.5	0.78	1.00	178.33	243	225	244	34	37	41	250	-3	101	55.84
	25	0.78	1.00	179.70	244	225	225	34	37	41	250	-3	96	55.88
	27.5	0.79	1.00	181.00	245	230	222	34	37	41	250	-3	101	56.28
5	30	0.79	1.00	182.38	246	231	239	34	37	41	250	-3	92	56.32
	32.5	0.81	1.10	183.64	245	226	230	34	37	41	250	-3	96	56.99
	35	0.81	1.10	184.97	246	227	230	34	37	41	250	-3	96	57.03
6	37.5	0.81	1.10	186.30	246	227	235	34	37	43	250	-4	100	57.03
	40	0.82	1.10	187.68	246	227	226	34	37	43	250	-4	98	57.38
	42.5	0.82	1.10	189.05	246	227	231	34	37	43	250	-4	100	57.38
7	45	0.89	1.20	190.44	245	227	232	34	37	43	250	-4	97	59.73
	47.5	0.87	1.20	191.85	245	227	230	34	37	43	250	-4	99	59.06
	50	0.87	1.20	193.27	245	228	230	34	37	43	250	-4	101	59.06
8	52.5	0.87	1.20	194.72	243	227	229	34	37	44	249	-4	100	58.97
	55	0.87	1.20	196.15	243	229	227	34	35	45	251	-4	101	58.97
	57.5	0.87	1.20	197.60	242	230	228	25	35	45	250	-4	99	58.93
	60			199.02										
Traverse 3- West														
1	0	0.8	1.00	199.05	255	251	247	34	35	36	250	-	102	57.03
	2.5	0.8	1.00	200.43	251	251	240	35	35	36	248	-3	99	56.87
	5	0.8	1.00	201.78	250	250	241	37	36	36	248	-3	100	56.83
2	7.5	0.8	1.00	203.15	250	252	248	35	36	36	248	-3	99	56.83
	10	0.8	1.00	204.51	250	252	248	35	36	38	249	-3	99	56.83
	12.5	0.8	1.00	205.87	250	259	245	36	36	41	250	-3	97	56.83
3	15	0.8	1.00	207.20	251	244	251	36	36	42	250	-3	99	56.87
	17.5	0.8	1.00	208.55	251	244	251	36	36	42	251	-3	100	56.87
	20	0.8	1.00	209.92	250	251	249	36	37	43	248	-3	99	56.83
4	22.5	0.8	1.00	211.27	250	251	242	36	37	42	250	-3	98	56.83
	25	0.8	1.00	212.61	249	258	240	36	37	42	250	-3	99	56.79
	27.5	0.8	1.00	213.97	251	255	241	36	37	42	250	-3	99	56.87
5	30	0.8	1.00	215.32	248	250	247	36	37	42	250	-3	103	56.75
	32.5	0.8	1.00	216.73	250	252	245	36	37	44	251	-3	95	56.83
	35	0.8	1.00	218.03	250	253	239	37	38	44	245	-3	100	56.83
6	37.5	0.7	0.93	219.40	251	252	241	37	38	44	249	-3	106	53.20
	40	0.7	0.93	220.76	250	241	243	37	39	44	248	-3	99	53.16
	42.5	0.7	0.93	222.03	251	241	250	37	38	44	251	-3	99	53.20
7	45	0.7	0.93	223.30	251	242	255	37	38	44	251	-3	99	53.20
	47.5	0.7	0.93	224.57	250	241	251	37	38	44	251	-3	100	53.16
	50	0.7	0.93	225.85	248	252	243	38	38	44	250	-3	100	53.09
8	52.5	0.7	0.93	227.13	251	252	241	38	38	44	250	-3	115	53.20
	55	0.7	0.95	228.61	231	228	249	31	41	43	250	-3	102	52.45
	57.5	0.7	0.95	229.95	242	235	248	31	41	43	250	-3	92	52.86
	60			231.15										
Traverse 4 - South														
1	0	0.74	0.95	231.15	242	239	248	35	38	45	250	-4.0	95	54.35
	2.5	0.74	0.95	232.41	242	242	248	35	38	45	250	-4.0	97	54.35
	5	0.70	0.93	233.70	241	244	244	35	38	45	250	-4.0	96	52.82
2	7.5	0.70	0.93	234.94	241	243	250	35	38	45	250	-4.0	94	52.82
	10	0.70	0.93	236.15	240	235	249	35	41	46	250	-4.0	99	52.79
	12.5	0.70	0.93	237.44	241	227	242	35	41	46	250	-4.0	101	52.82
3	15	0.72	0.97	238.75	242	228	236	35	41	46	250	-4.0	97	53.61
	17.5	0.72	0.97	240.03	242	232	231	35	42	46	250	-4.0	103	53.61
	20	0.72	0.97	241.39	240	232	233	35	42	46	250	-4.0	99	53.54
4	22.5	0.73	0.97	242.70	242	238	238	35	42	46	250	-4.0	97	53.98
	25	0.73	0.97	243.99	240	251	251	32	39	32	250	-4.0	105	53.91
	27.5	0.73	0.93	245.38	241	223	241	32	39	32	250	-4.0	97	53.94
5	30	0.74	0.95	246.67	241	227	252	32	41	32	250	-4.0	95	54.31
	32.5	0.74	0.95	247.94	241	225	247	32	41	32	250	-4.0	99	54.31
	35	0.74	0.95	249.27	244	228	248	33	43	40	250	-4.0	96	54.43
6	37.5	0.72	0.94	250.56	243	225	248	33	43	40	250	-4.0	97	53.65
	40	0.70	0.93	251.85	243	234	245	33	43	40	250	-4.0	100	52.90
	42.5	0.70	0.95	253.15	242	230	253	33	43	40	250	-4.0	94	52.86
7	45	0.70	0.95	254.38	243	228	244	33	43	40	250	-4.0	99	52.90
	47.5	0.72	0.97	255.67	242	237	251	33	43	40	250	-4.0	100	53.61
	50	0.72	0.97	257.00	243	234	248	34	43	44	250	-4.0	98	53.65
8	52.5	0.72	0.97	258.30	240	227	250	34	43	44	250	-4.0	100	53.54
	55	0.72	0.97	259.63	241	232	247	34	43	44	250	-4.0	98	53.57
	57.5	0.72	0.97	260.93	242	231	249	34	43	44	250	-4.0	100	53.61
	60			262.26										
Post-test Leak Check =		<0.01 at 13" Hg												
Average		0.77	1.01	128.19	247	241	241	34	38	41		-3	99	56

Sampling Results - Polycyclic Aromatic Hydrocarbons (PAH's)

Source: Main Stack Baseline

Test :	Blank	Test #1			Test #2			Test #3			AVERAGE RESULTS	
Sample Volume (Rm^3) [1] :	-	3.95			4.14			4.00				
Stack Flow Rate (Rm^3/s) [1] :	-	286.8			299.7			289.5			292.0	
	(µg)	(µg)	(µg/m^3)	(µg/s)	(µg)	(µg/m^3)	(µg/s)	(µg)	(µg/m^3)	(µg/s)	(µg/m^3)	(µg/s)
1-Methylnaphthalene	< 0.30	340	86.00	24700	278	67.20	20100	269	67.20	19400	73.40	< 21400
1-Methylphenanthrene	< 0.30	0.84	0.21	60.9	0.66	0.16	47.8	0.84	0.21	60.7	0.194	< 56.5
2-Chloronaphthalene	< 0.30	4.98	1.26	361	5.04	1.22	365	5.10	1.27	369	1.25	< 365.0
2-Methylanthracene	< 0.30	< 0.30	0.08	21.8	< 0.30	0.07	21.7	< 0.30	0.07	21.7	< 0.0744	< 21.7
2-Methylnaphthalene	< 0.30	545	138.00	39500	425	103.00	30800	414	103.00	29900	115.00	< 33400
3-Methylcholanthrene	< 0.30	< 0.30	0.08	21.8	< 0.30	0.07	21.7	< 0.30	0.07	21.7	< 0.0744	< 21.7
7,12-Dimethylbenzo(a)anthracene	< 1.2	< 1.2	0.30	87	< 1.2	0.29	86.9	< 1.2	0.30	86.8	< 0.298	< 86.9
9,10-Dimethylanthracene	< 0.30	< 0.30	0.08	21.8	< 0.30	0.07	21.7	< 0.30	0.07	21.7	< 0.07	< 21.7
9-Methylphenanthrene	< 0.30	1.86	0.47	135	1.38	0.33	99.9	1.92	0.48	139	0.43	< 125
Acenaphthene	< 0.30	5.46	1.38	396	5.04	1.22	365	4.68	1.17	338	1.26	< 366
Acenaphthylene	< 0.30	19.6	4.96	1420	6.00	1.45	435	5.88	1.47	425	2.62	< 760
Anthracene	< 0.30	0.54	0.14	39.2	< 0.30	0.07	21.7	0.30	0.07	21.7	< 0.0947	< 27.5
Benzo(a)anthracene	< 0.30	< 0.30	0.08	21.8	< 0.30	0.07	21.7	< 0.30	0.07	21.7	< 0.0744	< 21.7
Benzo(a)fluorene	< 0.30	< 0.30	0.08	21.8	< 0.30	0.07	21.7	< 0.30	0.07	21.7	< 0.0744	< 21.7
Benzo(a)pyrene	< 0.30	< 0.30	0.08	21.8	< 0.30	0.07	21.7	< 0.30	0.07	21.7	< 0.0744	< 21.7
Benzo(b)fluoranthene	< 0.30	< 0.30	0.08	21.8	< 0.30	0.07	21.7	< 0.30	0.07	21.7	< 0.0744	< 21.7
Benzo(b)fluorene	< 0.30	< 0.30	0.08	21.8	< 0.30	0.07	21.7	< 0.30	0.07	21.7	< 0.0744	< 21.7
Benzo(e)pyrene	< 0.30	< 0.30	0.08	21.8	< 0.30	0.07	21.7	< 0.30	0.07	21.7	< 0.0744	< 21.7
Benzo(g,h,i)perylene	< 0.30	< 0.30	0.08	21.8	< 0.30	0.07	21.7	< 0.30	0.07	21.7	< 0.0744	< 21.7
Benzo(k)fluoranthene	< 0.30	< 0.30	0.08	21.8	< 0.30	0.07	21.7	< 0.30	0.07	21.7	< 0.0744	< 21.7
Chrysene	< 0.30	< 0.30	0.08	21.8	< 0.30	0.07	21.7	< 0.30	0.07	21.7	< 0.0744	< 21.7
Coronene	< 0.30	< 0.30	0.08	21.8	< 0.30	0.07	21.7	< 0.30	0.07	21.7	< 0.0744	< 21.7
Dibenzo(a,c)anthracene	< 0.30	< 0.30	0.08	21.8	< 0.30	0.07	21.7	< 0.30	0.07	21.7	< 0.0744	< 21.7
Fluoranthene	< 0.30	< 0.30	0.08	21.8	< 0.30	0.07	21.7	< 0.30	0.07	21.7	< 0.0744	< 21.7
Fluorene	< 0.30	3.36	0.85	244	2.64	0.64	191	2.46	0.61	178	0.701	< 204
Indeno(1,2,3-cd)pyrene	< 0.30	< 0.30	0.08	21.8	< 0.30	0.07	21.7	< 0.30	0.07	21.7	< 0.0744	< 21.7
Naphthalene	< 0.30	930	235.00	67400	538	130.00	39000	498	124.00	36000	163	< 47500
Perylene	< 0.30	< 0.30	0.08	21.8	< 0.30	0.07	21.7	< 0.30	0.07	21.7	< 0.0744	< 21.7
Phenanthrene	< 0.30	12.8	3.24	928	7.80	1.88	565	10.3	2.57	745	2.56	< 746.0
Picene	< 0.30	< 0.30	0.08	21.8	< 0.30	0.07	21.7	< 0.30	0.07	21.7	< 0.0744	< 21.7
Pyrene	< 0.30	< 0.30	0.08	21.8	< 0.30	0.07	21.7	< 0.30	0.07	21.7	< 0.0744	< 21.7
Tetralin	< 0.30	188	47.50	13600	157	37.90	11400	149	37.20	10800	40.9	< 11900
Triphenylene	< 0.30	< 0.30	0.08	21.8	< 0.30	0.07	21.7	< 0.30	0.07	21.7	< 0.0744	< 21.7
1,2,3,4-Tetrachlorobenzene	< 0.30	< 0.30	0.08	21.8	< 0.30	0.07	21.7	< 0.30	0.07	21.7	< 0.0744	< 21.7
1,2,3,5+1,2,4,5-Tetrachlorobenzene	< 0.30	< 0.30	0.08	21.8	< 0.30	0.07	21.7	< 0.30	0.07	21.7	< 0.0744	< 21.7
1,2,3-Trichlorobenzene	< 0.30	1.55	0.39	112	1.99	0.48	144	4.51	1.13	326	0.666	< 194
1,2,4-Trichlorobenzene	< 0.30	2.66	0.67	193	2.60	0.63	188	2.30	0.57	166	0.625	< 182
1,2-Dichlorobenzene	< 0.30	7.22	1.83	524	7.43	1.80	538	6.08	1.52	440	1.71	< 500
1,3,5-Trichlorobenzene	< 0.30	< 0.30	0.08	21.8	< 0.30	0.07	21.7	< 0.30	0.07	21.7	< 0.0744	< 21.7
1,3-Dichlorobenzene	< 0.30	3.42	0.87	248	3.75	0.91	272	3.37	0.84	244	0.871	< 254
1,4-Dichlorobenzene	< 0.30	3.88	0.98	281	3.31	0.80	240	3.95	0.99	286	0.923	< 269
Hexachlorobenzene	< 0.30	< 0.30	0.08	21.8	< 0.30	0.07	21.7	< 0.30	0.07	21.7	< 0.074	< 21.7
Pentachlorobenzene	< 0.30	< 0.30	0.08	21.8	< 0.30	0.07	21.7	< 0.30	0.07	21.7	< 0.074	< 21.7
2,3,4,5-Tetrachlorophenol	< 0.30	< 1.2	0.30	87	< 1.2	0.29	86.9	< 0.30	0.07	21.7	< 0.223	< 65.2
2,3,4,6-Tetrachlorophenol	< 0.30	< 1.2	0.30	87	< 1.2	0.29	86.9	< 0.30	0.07	21.7	< 0.223	< 65.2
2,3,4-Trichlorophenol	< 0.30	< 1.2	0.30	87	< 1.2	0.29	86.9	< 0.30	0.07	21.7	< 0.223	< 65.2
2,3,5,6-Tetrachlorophenol	< 0.30	< 1.2	0.30	87	< 1.2	0.29	86.9	< 0.30	0.07	21.7	< 0.223	< 65.2
2,3,5-Trichlorophenol	< 0.30	< 1.2	0.30	87	< 1.2	0.29	86.9	< 0.30	0.07	21.7	< 0.223	< 65.2
2,3,6-Trichlorophenol	< 0.30	< 1.2	0.30	87	< 1.2	0.29	86.9	< 0.30	0.07	21.7	< 0.223	< 65.2
2,3-Dichlorophenol	< 0.30	< 1.2	0.30	87	< 1.2	0.29	86.9	< 0.30	0.07	21.7	< 0.223	< 65.2
2,4 + 2,5-Dichlorophenol	< 0.30	< 1.2	0.30	87	< 1.2	0.29	86.9	0.70	0.18	50.6	< 0.256	< 74.8
2,4,5-Trichlorophenol	< 0.30	< 1.2	0.30	87	< 1.2	0.29	86.9	< 0.30	0.07	21.7	< 0.223	< 65.2
2,4,6-Trichlorophenol	< 0.30	< 1.2	0.30	87	< 1.2	0.29	86.9	< 0.30	0.07	21.7	< 0.223	< 65.2
2,6-Dichlorophenol	< 0.30	< 1.2	0.30	87	< 1.2	0.29	86.9	< 0.30	0.07	21.7	< 0.223	< 65.2
2-Chlorophenol	< 0.30	18.7	4.73	1360	19.4	4.69	1410	16.9	4.22	1220	4.55	< 1330
3,4,5-Trichlorophenol	< 0.30	< 1.2	0.30	87	< 1.2	0.29	86.9	< 0.30	0.07	21.7	< 0.223	< 65.2
3,4-Dichlorophenol	< 0.30	< 1.2	0.30	87	< 1.2	0.29	86.9	< 0.30	0.07	21.7	< 0.223	< 65.2
3,5-Dichlorophenol	< 0.30	< 1.2	0.30	87	< 1.2	0.29	86.9	< 0.30	0.07	21.7	< 0.223	< 65.2
3-Chlorophenol	< 0.30	3.0	0.76	218	2.8	0.68	203	3.01	0.75	218	0.729	< 213
4-Chlorophenol	< 0.30	2.3	0.58	167	2.4	0.58	174	2.56	0.64	185	0.600	< 175
Pentachlorophenol	< 0.30	< 1.2	0.30	87	< 1.2	0.29	86.9	< 0.30	0.07	21.7	< 0.223	< 65.2

Notes:

[1] Sample volume and volumetric flow rate based on dry referenced conditions (101.3kPa, and 25°C)

'<' indicates that laboratory results were below the detection limit. The detection limit was used to calculate the concentration and emission rate.

Concentration and Emission Rate has been reported to 3 significant figures.

Sampling Results - Dioxins and Furans

Source: Main Stack Baseline

Test :	Blank	Test #1			Test #2			Test #3			Average Concentration	Average Concentration @25 °C and 11 % O_2	Reg 419 Toxic Equivalency Factors		
Sample Volume (m^3) [1] :		3.95			4.14			4.00					TEF	TEF Concentration	TEF Emission Rate
Stack Flow Rate (m^3/s) [1] :		286.8			299.7			289.5							
	(pg)	**(pg)**	**(pg/m^3)**	**(pg/s)**	**(pg)**	**(pg/m^3)**	**(pg/s)**	**(pg)**	**(pg/m^3)**	**(pg/s)**	**(pg/m^3)**	**(pg/m^3)**		**(pg TEQ/m^3)**	**(pg/s)**
2,3,7,8-Tetra CDD *	< 6.3	< 6.9	1.74	500	< 6.2	1.5	449	< 7.1	1.77	513	1.7	2.39	1	2.39	483
1,2,3,7,8-Penta CDD *	< 6.8	< 6.9	1.74	500	< 6.8	1.64	492	< 6.3	1.57	455	1.7	2.36	1	2.36	478
1,2,3,4,7,8-Hexa CDD *	< 6.7	< 6.5	1.64	471	< 6.4	1.55	464	< 7.2	1.8	521	1.7	2.37	0.1	0.237	48.1
1,2,3,6,7,8-Hexa CDD *	< 6.8	< 6.6	1.67	479	< 6.5	1.57	471	< 7.3	1.82	528	1.69	2.41	0.1	0.241	48.8
1,2,3,7,8,9-Hexa CDD *	< 6.2	< 6.1	1.54	442	< 6.0	1.45	435	< 6.7	1.67	484	1.56	2.23	0.1	0.223	45.1
1,2,3,4,6,7,8-Hepta CDD *	< 6.4	< 6.3	1.59	457	< 7.0	1.69	507	< 7.0	1.75	506	1.68	2.40	0.01	0.024	4.85
1,2,3,4,6,7,8,9-Octa CDD *	8.6	9.4	2.38	682	12.4	3	898	9.1	2.27	658	2.55	3.64	0.0003	0.00109	0.221
2,3,7,8-Tetra CDF **	< 6.4	< 6.6	1.67	479	< 6.1	1.47	442	< 6.9	1.72	499	1.6	2.31	0.1	0.231	46.8
1,2,3,7,8-Penta CDF **	< 7.1	< 6.5	1.64	471	< 6.9	1.67	500	< 7.0	1.75	506	1.69	2.41	0.03	0.0724	14.6
2,3,4,7,8-Penta CDF **	< 7.1	< 6.5	1.64	471	< 6.9	1.67	500	< 7.0	1.75	506	1.7	2.41	0.3	0.724	146
1,2,3,4,7,8-Hexa CDF **	< 6.0	< 6.1	1.54	442	< 6.0	1.45	435	< 6.4	1.6	463	1.53	2.18	0.1	0.218	44.2
1,2,3,6,7,8-Hexa CDF **	< 5.9	< 6.0	1.52	435	< 5.9	1.43	427	< 6.3	1.57	455	1.51	2.16	0.1	0.216	43.6
2,3,4,6,7,8-Hexa CDF **	< 6.3	< 6.4	1.62	464	< 6.3	1.52	456	< 6.7	1.67	484	1.6	2.28	0.1	0.228	46.2
1,2,3,7,8,9-Hexa CDF **	< 6.9	< 7.0	1.77	508	< 6.9	1.67	500	< 7.3	1.82	528	1.75	2.50	0.1	0.25	50.6
1,2,3,4,6,7,8-Hepta CDF **	< 5.9	< 4.3	1.09	312	< 5.7	1.38	413	< 5.3	1.32	383	1.26	1.80	0.01	0.018	3.64
1,2,3,4,7,8,9-Hepta CDF **	< 7.3	< 5.4	1.37	392	< 7.0	1.69	507	< 6.6	1.65	477	1.57	2.24	0.01	0.0224	4.54
1,2,3,4,6,7,8,9-Octa CDF **	< 6.6	< 6.5	1.64	471	< 6.7	1.62	485	< 6.6	1.65	477	1.64	2.34	0.0003	0.000703	0.142
33'44'-TetraCB-(77)	< 31	< 85	21.5	6160	< 39	9.42	2820	< 82	20.5	5930	17.1	24.42	0.0001	0.00244	0.494
344'5-TetraCB-(81)	< 30	< 83	21	6020	< 38	9.18	2750	< 81	20.2	5860	16.8	23.99	0.0003	0.0072	1.46
233'44'-PentaCB-(105)	< 18	79	20	5730	72	17.4	5210	110	27.5	7950	21.6	30.84	0.00003	0.000925	0.187
2344'5-PentaCB-(114)	< 18	< 41	10.4	2970	< 24	5.8	1740	< 41	10.2	2960	8.8	12.57	0.00003	0.000377	0.0763
23'44'5-PentaCB-(118)	45	250	63.2	18100	< 180	43.5	13000	310	77.4	22400	61.4	87.67	0.00003	0.00263	0.532
23'44'5'-PentaCB-(123)	< 20	< 46	11.6	3340	< 26	6.28	1880	< 46	11.5	3330	9.8	13.99	0.00003	0.00042	0.085
33'44'5-PentaCB-(126)	< 17	< 39	9.86	2830	< 23	5.56	1670	< 39	9.74	2820	8.39	11.98	0.1	1.20	242
HexaCB-(156)+(157)	< 32	< 82	20.7	5950	< 92	22.2	6660	66	16.5	4770	19.8	28.27	0.00003	0.000848	0.172
23'44'55'-HexaCB-(167)	< 30	< 79	20	5730	< 88	21.3	6370	< 57	14.2	4120	18.5	26.42	0.00003	0.000792	0.160
33'44'55'-HexaCB-(169)	< 32	< 84	21.2	6090	< 94	22.7	6810	< 61	15.2	4410	19.7	28.13	0.03	0.844	171
233'44'55'-HeptaCB-(189)	< 66	< 60	15.2	4350	< 68	16.4	4920	< 110	27.5	7950	19.7	28.13	0.00003	0.000844	0.171
											Total Toxic Equivalency →			9.52	1930

<u>Notes</u>:

[1] Sample volume and volumetric flow rate based on dry referenced conditions (101.3 kPa and 25°C)

***'<'** indicates that laboratory results were below the Reportable Detection Limit (RDL) This detection limit was used to calculate the concentration and emission rate.*

Concentration and Emission Rate has been reported to 3 significant figures.

*CDD = chlorodibenzo-*p*-dioxin

**CDF = chlorodibenzo-*p*-furan

***CB = chlorobenzene

Semi-Volatile Organic Compounds Sampling

Baseline Fuel: SVOC, December

Facility: St. Mary's			**Operator:** JDF		
City: Bowmanville, ON			**Entered by:** TFL		
Source: Main Stack Baseline			**Checked by:**		
Reference Method: Environment Canada 1/RM/2					

DATA INPUTS	Symbol	Units	Test #1 SVOC	Test #2 SVOC	Test #3 SVOC
Date			7-Dec-18	7-Dec-18	8-Dec-18
Start Time			8:24 AM	1:30 PM	7:56 AM
End Time			12:32 PM	5:40 PM	12:20 PM
Round Stack, Diameter (Inside)	d_s	in	216	216	216
Standard Temperature	T_s	°F	77	77	77
Standard Pressure	P_s	" Hg	29.9	29.9	29.9
Nozzle Diameter	D_n	in	0.212	0.211	0.211
Average Stack Temperature	T_s	°F	246	244	251
Average Meter Temperature	T_m	°F	37	47	53
Barometric Pressure	P_{bar}	" Hg	29.9	29.9	29.9
Stack Static Pressure	P_g	" H_2O	-0.7	-0.7	-0.7
Average Delta H	dH	" H_2O	1.01	1.14	1.10
Average Velocity Head	dP_{rms}	" H_2O	0.79	0.87	0.82
Pitot Coefficient	C_p	-	0.824	0.824	0.824
		Pitot ID ->	RWDI 7' #1		
Gas Sample Volume	V_m	ft³	130.73	139.37	136.37
DGM Calibration Factor	Y	-	0.998	0.998	0.998
		DGM ID ->	Console E		
Total Sampling Time	min	min	240	240	240
Stack Gas Oxygen Concentration	O_2	%	13.6	14.1	14.2
Stack Gas Carbon Dioxide Concentration	CO_2	%	10.6	10.7	10.6
Impinger Gain	W_w	g	197.7	220.1	204

Semi-Volatile Organic Compounds Sampling

Facility: St. Mary's	**Operator:** JDF
City: Bowmanville, ON	**Entered by:** TFL
Source: Main Stack Baseline	**Checked by:** 0
Reference Method: Environment Canada 1/RM/2	

Emissions Calculations	**Symbol**	**Units**	**Test #1** SVOC	**Test #2** SVOC	**Test #3** SVOC	**AVERAGE**
Nozzle Area	A_n	ft²	0.00025	0.00024	0.00024	
Stack Area	A_s	ft²	254.47	254.47	254.47	
Average Stack Temperature	T_s	°R	706	704	711	707
Average DGM Temperature	T_m	°R	497	507	513	
Sample Volume at Reference Conditions	V_{mStd}	ft³	139.74	146.22	141.48	
	$\mathbf{V_{mmstd}}$	**m³**	**3.95**	**4.14**	**4.00**	
Vol. of Water Vapour	V_{wStd}	ft³	9.4896	10.5648	9.792	
Water Fraction	B_{ws}		6.4%	6.7%	6.5%	6.5%
Molecular Weight, dry	M_d	g/mole	30.35	30.38	30.37	30.37
Molecular Weight, wet	M_w	g/mole	29.56	29.55	29.57	29.56
Absolute Stack Pressure	P_s	" Hg	29.85	29.85	29.85	29.85
Stack Gas Velocity	U_s	ft/s	55.98	58.57	57.03	57.20
	$\mathbf{U_{sm}}$	**m/s**	**17.06**	**17.85**	**17.38**	**17.43**
Actual Gas Flow Rate	Q_{act}	acf/min	854,735	894,316	870,816	873,289
Dry Gas Flow Rate (dry, ref)	Q_{ref}	dscf/min	607,837	635,143	613,510	618,830
	Q_{Rm}	m³/min	17208	17981	17368	17,519
	Qmref (Actual O_2)	**m³/s**	**286.80**	**299.68**	**289.47**	**292.0**
	Qmref (11% O_2)	**m³/sec**	**209.4**	**203.8**	**193.9**	**202.4**
Isokinetic Rate	I	%	99	100	101	100

Semi-Volatile Organic Compounds Sampling

Facility: St. Mary's
City: Bowmanville, ON
Source: Main Stack Baseline
Reference Method: Environment Canada 1/RM/2
Run: Test 1
Operator: JDF
Entered by: TFL
Checked by:
Test Date: 7-Dec-18

Point	Time (min)	Velocity Pressure (" H_2O)	Orifice Pressure (" H_2O)	Meter Volume (ft^3)	Stack Temp (^oF)	Probe Temp (^oF)	Box Temp (^oF)	Imp Temp (^oF)	Meter Temp (^oF)	XAD Trap (^oF)	Flex Line Temp (^oF)	Vacuum Pressure (" Hg)	Percentage Isokinetic (%)	Stack Velocity (ft/s)
Traverse 1- East														
Pre-Test Leak Check =		<0.02 at 10" Hg												
1	0	0.90	1.12	263.60	236	241	232	12	18	18	240	-	100	59.26
	2.5	0.90	1.12	265.01	237	251	245	12	20	21	235	-1	98	59.30
	5	0.90	1.12	266.39	237	251	245	12	20	21	245	-1	100	59.30
2	7.5	0.90	1.12	267.80	237	2374	244	13	22	50	245	-1	98	59.30
	10	0.90	1.12	269.20	237	240	241	13	22	51	250	-1	84	59.30
	12.5	0.90	1.12	270.40	237	250	241	13	22	51	250	-1	88	59.30
3	15	0.90	1.12	271.65	256	241	245	13	22	51	250	-1	98	60.10
	17.5	0.90	1.12	273.03	237	241	251	13	22	51	250	-1	100	59.30
	20	0.90	1.12	274.45	258	239	241	14	29	51	250	-1	108	60.18
4	22.5	0.90	1.12	275.99	239	239	241	14	29	51	250	-1	93	59.38
	25	0.90	1.12	277.33	239	240	241	14	30	51	250	-1	102	59.38
	27.5	0.90	1.12	278.80	240	236	240	14	31	51	250	-1	104	59.43
5	30	0.90	1.12	280.31	240	249	249	14	31	51	250	-1	101	59.43
	32.5	0.90	1.12	281.77	240	251	250	14	31	51	250	-1	102	59.43
	35	0.85	1.10	283.25	239	244	241	15	33	54	250	-1	100	57.71
6	37.5	0.85	1.10	284.66	238	241	251	15	33	54	250	-1	102	57.67
	40	0.70	0.93	286.10	238	240	241	15	33	56	250	-1	96	52.33
	42.5	0.70	0.93	287.33	238	241	241	15	34	58	251	-1	97	52.33
7	45	0.70	0.95	288.57	238	247	238	16	34	58	252	-1	98	52.33
	47.5	0.70	0.95	289.83	238	247	241	16	34	59	252	-1	99	52.33
	50	0.70	0.95	291.10	238	247	241	16	34	59	251	-1	93	52.33
8	52.5	0.70	0.95	292.30	239	245	250	16	34	59	251	-1	105	52.37
	55	0.70	0.95	293.65	240	241	250	15	36	60	252	-1	100	52.41
	57.5	0.70	0.95	294.94	240	241	250	15	36	60	251	-1	99	52.41
	60	-	-	296.21	-	-	-	-	-	-			-	-
Traverse 2 - North														
1	0	0.70	0.95	296.21	240	235	232	15	36	60	250	-1	97	52.41
	2.5	0.70	0.95	297.46	240	231	235	15	36	60	250	-1	96	52.41
	5	0.70	0.95	298.70	240	231	235	15	36	60	250	-1	103	52.41
2	7.5	0.70	0.95	300.03	241	236	235	17	38	60	250	-1	96	52.45
	10	0.70	0.95	301.27	240	235	232	17	37	60	250	-1	98	52.41
	12.5	0.70	0.95	302.53	340	235	232	17	37	60	250	-1	103	56.03
3	15	0.70	0.95	303.78	239	233	242	17	37	60	250	-1	97	52.37
	17.5	0.70	0.95	305.03	239	233	242	17	37	60	250	-1	101	52.37
	20	0.70	0.95	306.33	240	235	242	17	37	60	250	-1	94	52.41
4	22.5	0.70	0.95	307.54	240	239	252	17	37	60	250	-1	98	52.41
	25	0.70	0.95	308.80	239	252	241	17	37	62	250	-1	97	52.37
	27.5	0.70	0.95	310.05	241	252	240	17	37	62	250	-1	99	52.45
5	30	0.70	0.95	311.32	241	252	240	17	36	62	250	-1	99	52.45
	32.5	0.70	0.95	312.59	241	252	242	17	36	62	250	-1	98	52.45
	35	0.70	0.95	313.85	241	252	241	17	36	62	250	-1	99	52.45
6	37.5	0.70	0.95	315.13	241	252	241	17	36	62	250	-1	103	52.45
	40	0.90	1.12	316.45	243	253	240	17	36	62	250	-1	91	59.55
	42.5	0.90	1.12	317.78	242	241	239	18	35	63	250	-1	101	59.51
7	45	0.90	1.12	319.25	242	241	235	18	35	63	250	-1	102	59.51
	47.5	0.90	1.12	320.73	242	245	232	18	35	63	251	-1	98	59.51
	50	0.90	1.12	322.16	241	245	239	18	34	62	250	-2	102	59.47
8	52.5	0.90	1.12	323.64	241	235	236	18	34	62	250	-2	88	59.47
	55	0.90	1.12	324.92	241	232	235	18	34	62	248	-2	110	59.47
	57.5	0.90	1.12	326.52	241	231	235	18	35	62	250	-2	100	59.47
	60			327.97										
Traverse 3 - West														
1	0	0.90	1.12	328.00	241	242	239	18	31	51	250	-	98	59.47
	2.5	0.90	1.12	329.41	241	242	240	18	33	52	250	-4	97	59.47
	5	0.90	1.12	330.82	240	241	239	18	33	52	250	-4	102	59.43
2	7.5	0.90	1.12	332.30	243	241	241	18	34	52	250	-4	97	59.55
	10	0.90	1.12	333.71	241	240	235	18	36	52	250	-4	151	59.47
	12.5	0.90	1.12	335.91	241	240	235	18	36	52	250	-4	48	59.47
3	15	0.90	1.12	336.61	242	238	234	19	38	65	250	-4	102	59.51
	17.5	0.85	1.10	338.10	241	231	232	19	38	65	250	-4	100	57.79
	20	0.85	1.10	339.53	241	231	235	19	38	68	250	-4	101	57.79
4	22.5	0.85	1.10	340.97	241	242	238	19	38	68	250	-4	100	57.79
	25	0.85	1.10	342.39	241	242	238	19	38	68	250	-4	100	57.79
	27.5	0.85	0.90	343.81	242	248	232	19	37	57	250	-4	100	57.83
5	30	0.75	0.95	345.23	242	248	232	19	37	57	250	-4	99	54.33
	32.5	0.75	0.95	346.55	242	248	232	19	37	57	250	-4	101	54.33
	35	0.75	0.95	347.90	242	248	247	19	37	57	250	-4	101	54.33
6	37.5	0.75	0.95	349.25	242	248	247	19	37	57	250	-4	98	54.33
	40	0.75	0.95	350.56	242	241	241	19	37	48	250	-4	105	54.33
	42.5	0.75	0.95	351.96	242	241	241	19	37	48	250	-4	94	54.33
7	45	0.75	0.95	353.21	451	245	239	19	37	48	250	-4	112	61.89
	47.5	0.75	0.95	354.52	241	240	241	19	39	48	250	-4	99	54.29
	50	0.75	0.95	355.84	242	247	231	19	40	48	250	-4	97	54.33
8	52.5	0.75	0.95	357.14	242	241	239	19	41	48	250	-4	92	54.33
	55	0.75	0.95	358.38	241	240	239	20	41	48	250	-4	88	54.29
	57.5	0.75	0.95	359.56	240	242	241	20	42	48	250	-4	101	54.25
	60			360.92										
Traverse 4- East														
1	0	0.75	0.95	360.92	240	242	241	20	42	48	250	-	86	54.25
	2.5	0.75	0.95	362.08	241	242	243	20	42	48	250	-4	98	54.29
	5	0.75	0.95	363.40	243	242	241	21	42	48	250	-4	74	54.36
2	7.5	0.75	0.95	364.40	243	251	249	20	42	48	250	-4	137	54.36
	10	0.75	0.95	366.25	243	255	248	20	42	48	250	-4	101	54.36
	12.5	0.75	0.95	367.61	243	255	248	20	42	48	250	-4	101	54.36
3	15	0.75	0.95	368.97	243	255	248	20	43	48	250	-4	115	54.36
	17.5	0.75	0.95	370.52	245	255	249	20	46	48	250	-4	38	54.44
	20	0.75	0.95	371.03	246	255	234	22	46	43	250	-4	170	54.48
4	22.5	0.75	0.95	373.33	247	255	241	22	47	40	250	-4	100	54.52
	25	0.75	0.95	374.69	248	243	241	22	48	38	250	-4	102	54.56
	27.5	0.75	0.95	376.08	248	243	241	22	48	38	250	-4	101	54.56
5	30	0.75	0.95	377.45	250	244	232	23	48	31	250	-4	101	54.63
	32.5	0.75	0.95	378.82	250	242	236	23	48	32	250	-4	102	54.63
	35	0.75	0.95	380.21	250	242	238	23	48	32	250	-4	102	54.63
6	37.5	0.80	1.00	381.60	250	241	240	22	48	32	250	-4	101	56.43
	40	0.80	1.00	383.01	250	241	240	23	48	32	250	-4	100	56.43
	42.5	0.80	1.00	384.41	250	251	241	23	50	33	250	-4	102	56.43
7	45	0.80	1.00	385.84	250	251	241	23	51	33	250	-4	102	56.43
	47.5	0.80	1.00	387.27	249	251	247	23	50	33	250	-4	101	56.39
	50	0.80	1.00	388.69	251	242	247	22	51	33	250	-4	102	56.47
8	52.5	0.80	1.00	390.13	251	242	247	22	51	33	250	-5	101	56.47
	55	0.80	1.00	391.55	251	242	247	22	51	33	250	-5	100	56.47
	57.5	0.80	1.00	392.95	250	242	245	22	51	33	250	-5	100	56.43
	60			394.36										
Post-Test Leak Check =		<0.02 at 12" Hg												
	Average	0.79	1.01	130.73	245.50	265.48	240.60	17.92	37.32	90.96	249.49	-2.56	99.49	55.98

Semi-Volatile Organic Compounds Sampling

Facility: St. Mary's
City: Bowmanville, ON
Source: Main Stack Baseline
Reference Method: Environment Canada 1/RM/2
Run: Test 2

Operator: JDF
Entered by: TFL
Checked by: 0
Test Date: 7-Dec-18

Point	Time (min)	Velocity Pressure (" H_2O)	Orifice Pressure (" H_2O)	Meter Volume (ft^3)	Stack Temp (^oF)	Probe Temp (^oF)	Box Temp (^oF)	Imp Temp (^oF)	Meter Temp (^oF)	XAD Trap (^oF)	Flex Line Temp (^oF)	Vacuum Pressure (" Hg)	Percentage Isokinetic (%)	Stack Velocity (ft/s)
Traverse 1- East														
Pre-Test Leak Check =	<0.02 at 15" Hg													
1	0	0.85	1.10	395.32	250	241	244	23	38	20	250	-	103	58.18
	2.5	0.85	1.10	396.76	245	241	245	23	38	20	250	-1	99	57.97
	5	0.85	1.10	398.14	245	241	243	23	38	20	250	-1	99	57.97
2	7.5	0.85	1.10	399.53	242	249	243	21	39	20	250	-1	101	57.85
	10	0.90	1.12	400.95	244	242	234	25	41	35	250	-1	99	59.61
	12.5	0.90	1.12	402.39	244	239	241	28	41	35	250	-1	103	59.61
3	15	0.90	1.12	403.88	243	239	244	28	41	35	250	-1	98	59.57
	17.5	0.90	1.12	405.30	243	235	239	24	42	39	250	-1	102	59.57
	20	0.90	1.12	406.78	242	235	239	24	42	39	250	-1	102	59.52
4	22.5	0.90	1.12	408.26	243	249	231	24	43	39	250	-1	101	59.57
	25	0.90	1.12	409.74	242	248	250	24	43	39	250	-1	100	59.52
	27.5	0.90	1.12	411.20	242	252	248	35	43	39	250	-1	100	59.52
5	30	0.90	1.12	412.66	244	251	248	35	43	40	250	-1	103	59.61
	32.5	0.90	1.12	414.16	244	245	236	23	44	40	250	-1	99	59.61
	35	0.90	1.12	415.61	244	245	235	23	44	40	250	-1	100	59.61
6	37.5	0.90	1.12	417.07	244	245	230	23	44	40	250	-1	103	59.61
	40	0.90	1.12	418.57	244	245	231	23	44	40	250	-1	99	59.61
	42.5	0.90	1.12	420.01	244	245	240	28	47	40	250	-1	101	59.61
7	45	0.90	1.12	421.50	244	245	241	28	47	40	250	-1	102	59.61
	47.5	0.90	1.12	423.00	241	245	239	28	48	40	250	-1	96	59.48
	50	0.90	1.12	424.41	241	245	245	28	48	40	250	-1	100	59.48
8	52.5	0.90	1.12	425.89	242	246	246	27	48	40	250	-1	97	59.52
	55	0.90	1.12	427.32	242	245	246	27	48	40	250	-1	98	59.52
	57.5	0.85	1.10	428.77	244	252	242	23	49	40	250	-1	100	57.93
	60			430.20										
Traverse 2 - North														
1	0	0.85	1.10	430.20	249	251	246	23	49	60	250	-	101	58.14
	2.5	0.85	1.10	431.64	244	252	241	23	49	61	250	-1	100	57.93
	5	0.85	1.10	433.08	245	250	243	24	50	60	250	-1	101	57.97
2	7.5	0.82	1.10	434.53	245	251	241	24	49	60	250	-1	104	56.94
	10	0.85	1.10	436.00	245	251	241	24	49	40	250	-1	101	57.97
	12.5	0.85	1.10	437.44	245	251	241	24	49	40	250	-1	102	57.97
3	15	0.90	1.15	438.90	245	251	243	24	49	38	250	-1	101	59.65
	17.5	0.90	1.15	440.39	245	251	248	24	47	37	250	-3	102	59.65
	20	0.90	1.15	441.89	245	231	233	25	50	37	250	-3	102	59.65
4	22.5	0.90	1.15	443.39	245	231	233	28	50	40	250	-3	103	59.65
	25	0.90	1.18	444.91	245	231	233	25	50	45	250	-3	101	59.65
	27.5	0.90	1.18	446.40	245	230	242	24	51	45	250	-3	100	59.65
5	30	0.95	1.21	447.88	245	230	241	24	51	44	250	-3	104	61.29
	32.5	0.95	1.21	449.46	244	241	248	24	51	42	250	-3	101	61.24
	35	0.95	1.21	451.00	244	251	248	26	51	42	250	-3	103	61.24
6	37.5	0.95	1.21	452.57	244	251	248	28	51	42	250	-3	103	61.24
	40	0.95	1.21	454.14	244	251	248	27	51	42	250	-3	102	61.24
	42.5	0.95	1.21	455.69	244	252	248	27	51	42	250	-3	103	61.24
7	45	0.95	1.21	457.26	244	252	251	27	51	45	250	-3	101	61.24
	47.5	0.95	1.21	458.80	244	241	251	28	51	45	250	-3	103	61.24
	50	0.95	1.21	460.37	244	240	249	28	51	44	250	-3	101	61.24
8	52.5	0.95	1.21	461.91	244	250	249	28	51	44	250	-3	103	61.24
	55	0.95	1.21	463.47	244	251	240	28	51	44	250	-3	103	61.24
	57.5	0.95	1.21	465.03	244	250	247	28	51	44	250	-4	86	61.24
	60			466.34										
Traverse 3 - West														
1	0	0.90	1.12	466.65	245	251	249	25	47	32	240	-	112	59.65
	2.5	0.90	1.12	468.29	245	251	249	27	47	40	241	-3	102	59.65
	5	0.90	1.12	469.79	245	251	249	27	47	40	241	-3	102	59.65
2	7.5	0.90	1.12	471.29	244	251	246	24	38	40	241	-3	103	59.61
	10	0.90	1.12	472.77	244	244	241	24	39	40	250	-3	102	59.61
	12.5	0.90	1.12	474.25	244	251	249	24	48	40	250	-3	101	59.61
3	15	0.90	1.12	475.73	244	251	244	25	47	40	250	-3	103	59.61
	17.5	0.90	1.12	477.25	244	251	244	25	47	40	250	-3	97	59.61
	20	0.90	1.12	478.67	245	250	241	25	37	58	250	-3	104	59.65
4	22.5	0.85	1.10	480.17	243	251	242	29	47	58	250	-3	102	57.89
	25	0.85	1.10	481.63	243	250	241	29	47	57	250	-3	100	57.89
	27.5	0.85	1.10	483.06	243	251	241	25	46	57	250	-3	102	57.89
5	30	0.85	1.10	484.52	243	250	245	25	46	57	250	-3	100	57.89
	32.5	0.85	1.10	485.95	245	254	242	25	46	57	250	-3	102	57.97
	35	0.85	1.10	487.40	245	250	242	25	46	57	250	-3	105	57.97
6	37.5	0.85	1.10	488.89	245	250	242	25	46	57	250	-3	98	57.97
	40	0.85	1.10	490.28	245	250	242	25	46	57	250	-3	101	57.97
	42.5	0.85	1.10	491.72	245	250	242	25	46	57	250	-3	100	57.97
7	45	0.85	1.10	493.15	244	252	249	25	46	57	250	-3	102	57.93
	47.5	0.85	1.10	494.60	245	252	247	25	46	57	250	-3	105	57.97
	50	0.75	0.95	496.10	245	252	245	25	46	57	250	-3	105	54.45
8	52.5	0.75	0.95	497.50	244	251	249	25	47	57	250	-3	73	54.42
	55	0.75	0.95	498.48	244	251	249	25	47	57	250	-3	95	54.42
	57.5	0.75	0.95	499.75	244	251	249	25	47	57	250	-3	95	54.42
	60			501.02										
Traverse 4- South														
1	0	0.75	0.95	501.02	243	244	251	24	48	61	250	-	95	54.38
	2.5	0.75	0.95	502.30	242	222	251	24	48	61	250	-3	100	54.34
	5	0.75	0.95	503.65	242	225	251	24	48	60	250	-3	103	54.34
2	7.5	0.75	0.95	505.03	243	225	246	24	48	60	250	-3	93	54.38
	10	0.75	1.00	506.28	243	226	246	24	48	60	250	-3	98	54.38
	12.5	0.75	1.00	507.60	242	227	248	24	48	60	250	-3	98	54.34
3	15	0.75	1.00	508.92	242	230	246	24	48	60	250	-3	98	54.34
	17.5	0.76	1.00	510.24	243	232	248	24	48	60	250	-3	97	54.74
	20	0.76	1.10	511.55	241	230	249	24	48	60	250	-3	100	54.66
4	22.5	0.76	1.10	512.90	241	230	247	25	48	61	250	-3	101	54.66
	25	0.85	1.20	514.27	241	230	246	25	48	61	250	-3	98	57.81
	27.5	0.85	1.20	515.68	241	230	248	25	48	61	250	-3	102	57.81
5	30	0.85	1.30	517.14	241	230	248	25	48	61	250	-3	102	57.81
	32.5	0.88	1.30	518.60	241	230	246	25	48	61	250	-3	101	58.82
	35	0.86	1.30	520.07	242	230	246	28	50	62	250	-3	102	58.19
6	37.5	0.88	1.30	521.55	242	231	247	28	50	62	250	-3	103	58.86
	40	0.90	1.40	523.05	242	231	248	28	50	62	250	-3	100	59.52
	42.5	0.90	1.40	524.53	242	225	250	28	50	62	250	-3	101	59.52
7	45	0.90	1.40	526.02	242	227	246	28	50	62	250	-3	101	59.52
	47.5	0.90	1.40	527.52	241	229	247	28	50	62	250	-3	101	59.48
	50	0.90	1.40	529.02	241	231	243	28	50	62	250	-3	101	59.48
8	52.5	0.90	1.40	530.51	242	231	242	28	50	62	250	-3	101	59.52
	55	0.90	1.40	532.00	244	229	248	28	50	62	250	-3	100	59.61
	57.5	0.90	1.40	533.48	241	234	247	28	50	62	250	-3	103	59.48
	60			535.00										
Post-Test Leak Check =	<0.01 at 11" Hg													
	Average	0.87	1.14	139.37	243.57	242.51	244.24	25.66	46.85	115.53	249.46	-2.38	100.49	58.57

Semi-Volatile Organic Compounds Sampling

Facility: St. Mary's
City: Bowmanville, ON
Source: Main Stack Baseline
Reference Method: Environment Canada 1/RM/2
Run: Test 3
Operator: JDF
Entered by: TFL
Checked by: 0
Test Date: 8-Dec-18

Point	Time (min)	Velocity Pressure (" H_2O)	Orifice Pressure (" H_2O)	Meter Volume (ft^3)	Stack Temp (^oF)	Probe Temp (^oF)	Box Temp (^oF)	Imp Temp (^oF)	Meter Temp (^oF)	XAD Trap (^oF)	Vacuum Pressure (" Hg)	Percentage Isokinetic (%)	Stack Velocity (ft/sec)
Traverse 1- West													
Pre-test Leak Check =		<0.02 at 10" Hg											
1	0	0.9	1.12	535.49	246	241	235	20	30	17	-	103	59.67
	2.5	0.9	1.12	536.95	247	241	237	33	29	17	-1	102	59.71
	5	0.9	1.12	538.39	247	245	235	21	33	17	-1	96	59.71
2	7.5	0.9	1.12	539.76	247	246	247	21	34	17	-1	97	59.71
	10	0.9	1.12	541.15	248	246	235	21	36	30	-1	106	59.76
	12.5	0.9	1.12	542.67	247	247	251	22	37	51	-3	97	59.71
3	15	0.9	1.12	544.07	248	250	251	22	37	59	-3	101	59.76
	17.5	0.9	1.12	545.53	248	249	253	22	38	61	-3	102	59.76
	20	0.9	1.12	547.00	248	249	246	22	39	62	-3	102	59.76
4	22.5	0.9	1.12	548.47	248	250	251	22	38	62	-3	101	59.76
	25	0.9	1.12	549.92	247	247	247	21	40	65	-3	101	59.71
	27.5	0.9	1.12	551.39	248	246	252	21	41	65	-3	101	59.76
5	30	0.8	1.10	552.85	249	248	250	21	42	63	-3	102	56.38
	32.5	0.8	1.10	554.25	249	248	250	23	42	63	-3	101	56.38
	35	0.8	1.10	555.64	249	248	252	23	45	62	-3	101	56.38
6	37.5	0.8	1.10	557.03	250	247	252	23	45	62	-3	102	56.42
	40	0.8	1.10	558.43	250	241	251	24	45	62	-3	100	56.42
	42.5	0.7	0.95	559.81	247	251	247	24	48	62	-3	102	52.66
7	45	0.7	0.95	561.13	247	251	247	24	48	62	-3	99	52.66
	47.5	0.7	0.95	562.41	247	251	247	24	48	61	-3	102	52.66
	50	0.7	0.95	563.73	248	249	251	25	51	61	-3	100	52.70
8	52.5	0.7	0.95	565.04	248	249	242	26	52	58	-3	100	52.70
	55	0.7	0.95	566.35	251	248	241	26	52	58	-3	100	52.81
	57.5	0.7	0.95	567.65	249	245	245	26	54	58	-3	99	52.74
	60			568.95									
Traverse 2- North													
1	0	0.7	0.95	568.95	250	245	245	26	54	58	-	101	52.77
	2.5	0.7	0.95	570.28	251	248	252	27	55	58	-3	98	52.81
	5	0.7	0.95	571.56	250	249	250	27	55	58	-3	101	52.77
2	7.5	0.7	0.95	572.88	249	243	254	28	56	58	-3	99	52.74
	10	0.7	0.95	574.18	251	249	254	28	56	58	-3	100	52.81
	12.5	0.7	0.95	575.50	248	247	250	28	56	58	-3	99	52.70
3	15	0.8	1.10	576.80	249	247	251	30	57	58	-3	100	56.38
	17.5	0.8	1.10	578.21	249	247	251	30	58	58	-3	101	56.38
	20	0.8	1.10	579.64	250	253	252	30	60	58	-3	98	56.42
4	22.5	0.8	1.10	581.03	250	246	249	31	60	58	-3	100	56.42
	25	0.8	1.10	582.45	250	246	249	31	60	58	-3	102	56.42
	27.5	0.9	1.22	583.90	251	249	252	32	61	58	-3	98	59.88
5	30	0.9	1.22	585.37	251	250	252	32	61	58	-3	100	59.88
	32.5	0.9	1.22	586.88	251	250	249	32	63	58	-3	99	59.88
	35	0.9	1.22	588.38	252	251	251	32	63	58	-3	99	59.93
6	37.5	0.9	1.22	589.88	252	249	250	33	64	58	-3	100	59.93
	40	0.9	1.22	591.39	252	250	251	33	64	58	-3	99	59.93
	42.5	0.9	1.22	592.89	251	252	250	35	66	58	-3	99	59.88
7	45	0.9	1.22	594.40	254	248	249	35	66	58	-3	99	60.01
	47.5	0.9	1.22	595.90	252	248	249	35	66	58	-3	100	59.93
	50	0.9	1.22	597.42	245	249	251	35	67	58	-3	100	59.63
8	52.5	0.9	1.22	598.95	249	251	252	35	67	58	-3	100	59.80
	55	0.9	1.22	600.47	250	251	251	35	67	58	-3	102	59.84
	57.5	0.9	1.22	602.03	250	251	251	35	67	58	-3	98	59.84
	60			603.52									
Traverse 3- West													
1	0	0.9	1.22	603.54	250	251	252	30	56	36	-	100	59.84
	2.5	0.9	1.22	605.03	255	241	240	31	56	57	-3	100	60.05
	5	0.9	1.22	606.52	255	239	242	33	54	54	-3	101	60.05
2	7.5	0.9	1.22	608.02	255	239	241	33	54	56	-3	101	60.05
	10	0.9	1.22	609.52	255	239	243	33	54	56	-3	101	60.05
	12.5	0.9	1.22	611.02	254	241	249	35	56	63	-3	101	60.01
3	15	0.83	1.12	612.52	254	241	249	35	57	63	-3	99	57.63
	17.5	0.83	1.12	613.94	254	241	242	35	57	63	-3	101	57.63
	20	0.83	1.12	615.39	254	245	249	35	57	63	-3	102	57.63
4	22.5	0.8	1.15	616.85	254	247	247	35	60	64	-3	99	56.58
	25	0.82	1.15	618.25	255	247	249	36	56	62	-3	100	57.32
	27.5	0.82	1.15	619.67	254	247	253	36	56	62	-3	102	57.28
5	30	0.82	1.15	621.12	254	245	247	36	56	62	-3	102	57.28
	32.5	0.8	1.10	622.57	254	246	253	36	56	62	-3	102	56.58
	35	0.8	1.10	624.00	254	245	247	36	56	62	-3	101	56.58
6	37.5	0.8	1.10	625.42	255	248	249	33	56	62	-3	99	56.62
	40	0.8	1.10	626.81	255	241	241	33	56	62	-3	102	56.62
	42.5	0.8	1.10	628.24	255	240	251	33	56	62	-3	102	56.62
7	45	0.82	1.10	629.67	255	246	251	33	56	62	-3	102	57.32
	47.5	0.76	1.00	631.11	253	232	252	33	54	41	-3	101	55.11
	50	0.76	1.00	632.49	255	226	235	33	54	41	-3	102	55.18
8	52.5	0.76	1.00	633.88	253	225	240	33	54	41	-3	95	55.11
	55	0.76	1.00	635.18	253	228	233	32	54	40	-3	100	55.11
	57.5	0.76	1.00	636.55	254	225	245	32	51	40	-3	103	55.14
	60			637.94									
Traverse 4 - South													
1	0	0.75	1.00	637.94	252	232	248	32	52	40	-	102	54.70
	2.5	0.76	1.00	639.31	253	232	249	32	52	40	-3	100	55.11
	5	0.74	1.00	640.67	254	235	241	32	52	40	-3	103	54.41
2	7.5	0.74	1.00	642.05	252	235	237	32	51	40	-3	101	54.34
	10	0.74	1.00	643.40	253	234	244	32	51	40	-3	103	54.38
	12.5	0.74	1.00	644.78	252	234	243	32	51	37	-3	102	54.34
3	15	0.74	1.00	646.15	253	230	246	32	51	37	-3	102	54.38
	17.5	0.79	1.10	647.52	252	230	246	32	51	37	-3	100	56.14
	20	0.79	1.10	648.90	252	230	241	31	50	36	-3	101	56.14
4	22.5	0.79	1.10	650.30	252	230	245	31	51	36	-3	102	56.14
	25	0.80	1.10	651.71	252	231	240	31	51	36	-3	102	56.50
	27.5	0.80	1.10	653.13	251	225	226	31	51	36	-3	99	56.46
5	30	0.80	1.10	654.51	253	225	225	31	52	37	-3	100	56.54
	32.5	0.82	1.15	655.90	254	225	226	31	52	37	-3	99	57.28
	35	0.82	1.10	657.30	253	224	230	30	53	37	-3	103	57.24
6	37.5	0.82	1.10	658.75	254	224	230	30	53	37	-3	99	57.28
	40	0.82	1.10	660.15	253	230	244	30	53	37	-3	100	57.24
	42.5	0.82	1.10	661.57	252	222	230	30	53	37	-3	101	57.20
7	45	0.84	1.20	663.00	253	234	244	31	54	38	-3	103	57.93
	47.5	0.84	1.20	664.47	252	245	243	31	54	39	-3	103	57.89
	50	0.84	1.20	665.95	252	237	239	31	54	39	-3	103	57.89
8	52.5	0.84	1.20	667.42	253	226	240	31	54	39	-3	104	57.93
	55	0.84	1.20	668.91	252	225	234	31	54	39	-3	104	57.89
	57.5	0.84	1.20	670.40	253	223	233	31	54	39	-3	103	57.93
	60			671.88									
Post-test Leak Check =		<0.02 at 15" Hg											
	Average	0.82	1.10	136.37	251	242	245	30	53	51	-3	101	57

APPENDIX E

Summary of PM_{10} and $PM_{2.5}$ Results
October Baseline

Test	Date	PM_{10}		$PM_{2.5}$	
		Concentration mg/m^3	Emission Rate g/sec	Concentration mg/m^3	Emission Rate g/sec
1	30-Sep-18	1.64	0.465	0.597	0.169
2	1-Oct-18	1.65	0.469	0.598	0.170
3	2-Oct-18	1.58	0.449	0.750	0.214
Average		1.62	0.461	0.648	0.184

<u>Notes:</u>
- Sampling followed US EPA Method 201A
- All referenced concentration values are expressed at dry, 25°C, 101.3 kPa and Actual Oxygen

Method 201A - $PM_{10/2.5}$ Calculations

Date:	30-Sep-18
Client:	St. Marys
Plant:	Bowmanville
Location:	Bowmanville
Test No.:	Test No. 1 Baseline
Test Location:	Main Stack

Project No.: 1804600
Operator: KNE/MP

Stack Diameter (m)	5.49
Stack Width (m)	0.00
Stack Breadth (m)	0.00
Stack Area (m^2)	23.64
No. of Traverses	4
No. of Points Per Traverse	3
Data Readings Per Point	1
DGMCF	1.026
Pitot Factor	0.841
Barometric Pressure (" Hg)	29.90
Static Pressure ("H_2O)	-0.70
Oxygen Content (%)	13.6
Carbon Dioxide Content (%)	10.6
Carbon Monoxide Content (PPM)	223
Assumed Moisture (%)	
Nozzle Diameter #1 (inches)	0.175

Cyclone Sampling Parameters		
Cyclone Qs_{ST}	0.40 Rft³/min*	11.2 l/min*
Cyclone Qs_{actual}	0.58 ft³/min	16.4 l/min
Stack Gas Sampling Parameters		
V_{ms}	47.4 Rft³*	1.341 Rm³*
Average Cyclone I Cut Diameter		10.24 µm
Average Cyclone IV Cut Diameter		2.29 µm
Average Isokineticity		100.4 %
Stack Gas Physical Parameters		
B_{ws}	7.6 % v/v	
Average m	223.3 (dimensionless)	
M_d	30.24 lbs/lbs mole	
M_w	29.31 lbs/lbs mole	
Average T_s	263 °F	128 °C
Average U_s	57.5 ft/s	17.5 m/s
Stack Area	254.4 ft²	23.64 m²
Actual Q_s	877468 ACFM	414.1 m³/s
Wet Reference Q_s	650397 SCFM*	307.0 Rm³/s*
Dry Reference Q_s	600991 SCFM*	283.6 Rm³/s*
Summary of Particulate Emission Rates		
	Dry Ref. Conc.	**Emission Rate**
Total Part.	4.3996 mg/Rm³*	1.248 g/s
PM_{10} Part.	1.6405 mg/Rm³*	0.465 g/s
$PM_{2.5}$ Part.	0.5965 mg/Rm³*	0.169 g/s

Impinger Recovery	Impinger 1	Impinger 2	Impinger 3	Impinger 4	
initial volume or weight (ml or mg)	738.8	733.4	645.4	924.2	
final volume or weight (ml or mg)	797.3	740.2	647.2	938.2	
gain in volume or weight (ml or mg)	58.5	6.8	1.8	14.0	
				TOTAL	**81.1**

Particulate Weight Gains	>10mm	<10mm, >2.5mm	<2.5mm	Filter (<2.5µm)
particulate weight gains (mg)	3.70	<1.40	<0.50	<0.30

***Reference conditions:25°C, 101.3 KPa**
The lab RDL is used for results that are less than detect

Test Data Page Calculations

Date: 30-Sep-18	**Plant:** Bowmanville	**Test No.:** Test No. 1 Baseline	**Project No.:** 1804600
Client: St. Marys	**Location:** Bowmanville	**Test location:** Main Stack	**Operator:** KNE/MP

Port No.	Point	Clock Time (min)	Dwell Time (min)	Dry Gas Meter (ft^3)	DR ("H_2O)	Desired cfm	Stack Temp (°F)	Meter Temp		Meter Pressure DH ("H_2O)	Pump Vacuum Gauge ("Hg)	Stack Gas Velocity (ft/s)	Cyclone I Cut Diam. (mm)	Cyclone IV Cut Diam. (mm)	ISO (%)
								Outlet (°F)	Inlet (°F)						
Trav 1	1	0.00	10.00	318.00	0.85	0.39	265	72	73	0.45	2.0	60.2	10.19	2.27	96.9
	2	10.00	10.00	321.86	0.85	0.39	264	72	71	0.45	2.0	60.2	10.12	2.24	97.8
	3	20.00	10.50	325.75	0.80	0.39	262	72	71	0.44	2.0	58.3	10.23	2.28	99.1
				329.77											
Trav 2	1	30.50	10.25	329.77	0.75	0.39	261	72	71	0.44	2.0	56.4	10.26	2.29	101.9
	2	40.75	9.75	333.68	0.75	0.39	262	72	71	0.44	2.0	56.5	10.26	2.29	102.0
	3	50.50	9.50	337.40	0.70	0.39	261	72	71	0.44	2.0	54.5	10.32	2.32	104.5
		60.00		340.99											
Trav 3	1	60.00	9.75	340.99	0.79	0.39	262	72	70	0.44	3.0	58.0	10.35	2.33	98.1
	2	69.75	10.25	344.66	0.78	0.39	262	70	68	0.44	3.0	57.6	10.26	2.29	99.9
	3	80.00	10.25	348.55	0.74	0.39	262	70	68	0.44	3.0	56.1	10.28	2.30	102.3
				352.43											
Trav 4	1	90.25	10.25	352.43	0.78	0.39	264	69	66	0.44	4.0	57.7	10.21	2.28	100.9
	2	100.50	9.50	356.34	0.77	0.39	264	68	66	0.44	4.0	57.3	10.23	2.28	101.2
	3	110.00	9.50	359.95	0.76	0.39	264	68	66	0.44	4.0	56.9	10.23	2.28	101.9
		119.50		363.56											
Averages					**0.78**		**263**	**70**		**0.44**		**57.5**	**10.24**	**2.29**	**100.4**

Method 201A - $PM_{10/2.5}$ Calculations

Date:	1-Oct-18
Client:	St. Marys
Plant:	Bowmanville
Location:	Bowmanville
Test No.:	Test No. 2 Baseline
Test Location:	Main Stack

Project No.: 1804600
Operator: KNE/MP

Stack Diameter (m)	5.49
Stack Width (m)	0.00
Stack Breadth (m)	0.00
Stack Area (m^2)	23.64
No. of Traverses	4
No. of Points Per Traverse	3
Data Readings Per Point	1
DGMCF	1.026
Pitot Factor	0.841
Barometric Pressure (" Hg)	29.90
Static Pressure ("H_2O)	0.70
Oxygen Content (%)	14.1
Carbon Dioxide Content (%)	10.7
Carbon Monoxide Content (PPM)	0
Assumed Moisture (%)	
Nozzle Diameter #1 (inches)	0.175

Cyclone Sampling Parameters		
Cyclone Qs_{ST}	0.39 Rft³/min*	11.1 l/min*
Cyclone Qs_{actual}	0.57 ft³/min	16.1 l/min
Stack Gas Sampling Parameters		
V_{ms}	47.2 Rft³*	1.337 Rm³*
Average Cyclone I Cut Diameter		10.28 µm
Average Cyclone IV Cut Diameter		2.29 µm
Average Isokineticity		99.3 %
Stack Gas Physical Parameters		
B_{ws}	7.9 % v/v	
Average m	215.3 (dimensionless)	
M_d	30.28 lbs/lbs mole	
M_w	29.30 lbs/lbs mole	
Average T_s	254 °F	123 °C
Average U_s	57.0 ft/s	17.4 m/s
Stack Area	254.4 ft²	23.64 m²
Actual Q_s	870695 ACFM	410.9 m³/s
Wet Reference Q_s	655616 SCFM*	309.4 Rm³/s*
Dry Reference Q_s	603635 SCFM*	284.9 Rm³/s*
Summary of Particulate Emission Rates		
	Dry Ref. Conc.	**Emission Rate**
Total Part.	4.6370 mg/Rm³*	1.321 g/s
PM_{10} Part.	1.6454 mg/Rm³*	0.469 g/s
$PM_{2.5}$ Part.	0.5983 mg/Rm³*	0.170 g/s

Impinger Recovery	Impinger 1	Impinger 2	Impinger 3	Impinger 4	
initial volume or weight (ml or mg)	797.3	740.2	647.2	934.2	
final volume or weight (ml or mg)	859.4	750.9	648.8	944.5	
gain in volume or weight (ml or mg)	62.1	10.7	1.6	10.3	
				TOTAL	**84.7**

Particulate Weight Gains	>10mm	<10mm, >2.5mm	<2.5mm	Filter (<2.5µm)
particulate weight gains (mg)	4.00	1.40	<0.50	<0.30

***Reference conditions:25°C, 101.3 KPa**
The lab RDL is used for results that are less than detect

Test Data Page Calculations

Date: 1-Oct-18	**Plant:** Bowmanville	**Test No.:** Test No. 2 Baseline	**Project No.:** 1804600
Client: St. Marys	**Location:** Bowmanville	**Test location:** Main Stack	**Operator:** KNE/MP

Port No.	Point	Clock Time (min)	Dwell Time (min)	Dry Gas Meter (ft^3)	DR ("H_2O)	Desired cfm	Stack Temp (°F)	Meter Temp Outlet (°F)	Meter Temp Inlet (°F)	Meter Pressure DH ("H_2O)	Pump Vacuum Gauge ("Hg)	Stack Gas Velocity (ft/s)	Cyclone I Cut Diam. (mm)	Cyclone IV Cut Diam. (mm)	ISO (%)
Trav 1	1	0.00	10.50	299.47	0.85	0.38	255	73	72	0.45	0.0	59.7	10.28	2.29	94.9
	2	10.50	10.50	303.46	0.85	0.38	254	73	72	0.45	0.0	59.7	10.28	2.29	94.9
	3	21.00	10.25	307.45	0.80	0.38	254	73	72	0.45	0.0	57.9	10.28	2.29	97.8
				311.35											
Trav 2	1	31.25	9.75	311.35	0.75	0.38	252	73	71	0.44	0.0	56.0	10.27	2.29	100.9
	2	41.00	9.75	315.05	0.75	0.38	255	75	71	0.44	0.0	56.1	10.29	2.30	101.0
	3	50.75	9.50	318.76	0.70	0.38	252	75	71	0.44	0.0	54.1	10.28	2.29	104.3
		60.25		322.37											
Trav 3	1	60.25	10.00	322.37	0.79	0.38	255	75	71	0.44	0.0	57.6	10.29	2.30	98.4
	2	70.25	10.00	326.17	0.78	0.38	252	75	71	0.44	0.0	57.1	10.28	2.29	98.8
	3	80.25	9.75	329.97	0.74	0.38	254	73	70	0.44	0.0	55.7	10.26	2.29	101.9
				333.67											
Trav 4	1	90.00	10.00	333.67	0.78	0.38	255	73	70	0.44	0.0	57.2	10.27	2.29	99.3
	2	100.00	10.00	337.47	0.77	0.38	254	73	70	0.44	0.0	56.8	10.26	2.29	99.8
	3	110.00	10.00	341.27	0.76	0.38	255	73	70	0.44	0.0	56.5	10.27	2.29	100.6
		120.00		345.07											
Averages					**0.78**		**254**	**72**		**0.44**		**57.0**	**10.28**	**2.29**	**99.3**

Method 201A - $PM_{10/2.5}$ Calculations

Date:	2-Oct-18
Client:	St. Marys
Plant:	Bowmanville
Location:	Bowmanville
Test No.:	Test No. 3 Baseline
Test Location:	Main Stack

Project No.: 1804600
Operator: KNE/MP

Stack Diameter (m)	5.49
Stack Width (m)	0.00
Stack Breadth (m)	0.00
Stack Area (m^2)	23.64
No. of Traverses	4
No. of Points Per Traverse	3
Data Readings Per Point	1
DGMCF	1.026
Pitot Factor	0.841
Barometric Pressure (" Hg)	29.90
Static Pressure ("H_2O)	0.70
Oxygen Content (%)	14.2
Carbon Dioxide Content (%)	10.6
Carbon Monoxide Content (PPM)	0
Assumed Moisture (%)	
Nozzle Diameter #1 (inches)	0.175

Cyclone Sampling Parameters		
Cyclone Qs_{ST}	0.39 Rft³/min*	11.1 l/min*
Cyclone Qs_{actual}	0.56 ft³/min	16.0 l/min
Stack Gas Sampling Parameters		
V_{ms}	47.1 Rft³*	1.333 Rm³*
Average Cyclone I Cut Diameter		10.32 µm
Average Cyclone IV Cut Diameter		2.31 µm
Average Isokineticity		98.6 %
Stack Gas Physical Parameters		
B_{ws}	7.5 % v/v	
Average m	221.3 (dimensionless)	
M_d	30.26 lbs/lbs mole	
M_w	29.34 lbs/lbs mole	
Average T_s	254 °F	123 °C
Average U_s	56.8 ft/s	17.3 m/s
Stack Area	254.4 ft²	23.64 m²
Actual Q_s	867134 ACFM	409.2 m³/s
Wet Reference Q_s	652629 SCFM*	308.0 Rm³/s*
Dry Reference Q_s	603636 SCFM*	284.9 Rm³/s*
Summary of Particulate Emission Rates		
	Dry Ref. Conc.	**Emission Rate**
Total Part.	3.3004 mg/Rm³*	0.940 g/s
PM_{10} Part.	1.5752 mg/Rm³*	0.449 g/s
$PM_{2.5}$ Part.	0.7501 mg/Rm³*	0.214 g/s

Impinger Recovery	Impinger 1	Impinger 2	Impinger 3	Impinger 4	
initial volume or weight (ml or mg)	750.7	708.8	648.8	810.4	
final volume or weight (ml or mg)	814.6	715.2	649.7	818.8	
gain in volume or weight (ml or mg)	63.9	6.4	0.9	8.4	
				TOTAL	**79.6**

Particulate Weight Gains	>10mm	<10mm, >2.5mm	<2.5mm	Filter (<2.5µm)
particulate weight gains (mg)	2.30	1.10	<0.30	<0.70

***Reference conditions:25°C, 101.3 KPa**
The lab RDL is used for results that are less than detect

Test Data Page Calculations

Date: 1-Oct-18	**Plant:** Bowmanville	**Test No.:** Test No. 3 Baseline	**Project No.:** 1804600
Client: St. Marys	**Location:** Bowmanville	**Test location:** Main Stack	**Operator:** KNE/MP

Port No.	Point	Clock Time (min)	Dwell Time (min)	Dry Gas Meter (ft^3)	DR ("H_2O)	Desired cfm	Stack Temp (°F)	Meter Temp Outlet (°F)	Meter Temp Inlet (°F)	Meter Pressure DH ("H_2O)	Pump Vacuum Gauge ("Hg)	Stack Gas Velocity (ft/s)	Cyclone I Cut Diam. (mm)	Cyclone IV Cut Diam. (mm)	ISO (%)
Trav 1	1	0.00	10.50	479.60	0.86	0.38	254	76	76	0.44	0.0	60.0	10.37	2.33	93.3
	2	10.50	10.50	483.59	0.84	0.38	256	73	73	0.44	0.0	59.4	10.33	2.31	95.1
	3	21.00	10.25	487.58	0.80	0.38	254	73	73	0.44	0.0	57.9	10.33	2.31	97.3
				491.48											
Trav 2	1	31.25	10.50	491.48	0.84	0.38	255	73	73	0.44	0.0	59.3	10.33	2.31	95.0
	2	41.75	10.25	495.47	0.82	0.38	255	73	73	0.44	0.0	58.6	10.33	2.31	96.2
	3	52.00	10.00	499.36	0.78	0.38	253	73	71	0.44	0.0	57.1	10.31	2.30	98.7
		62.00		503.16											
Trav 3	1	62.00	10.00	503.16	0.76	0.38	253	73	71	0.44	0.0	56.4	10.31	2.30	99.9
	2	72.00	9.75	506.96	0.74	0.38	253	73	71	0.44	0.0	55.6	10.31	2.30	101.3
	3	81.75	9.50	510.67	0.70	0.38	251	75	70	0.44	0.0	54.0	10.32	2.30	103.9
				514.28											
Trav 4	1	91.25	9.75	514.28	0.74	0.38	255	75	70	0.44	0.0	55.7	10.32	2.31	101.3
	2	101.00	9.50	517.98	0.72	0.38	256	75	70	0.44	0.0	55.0	10.32	2.31	102.8
	3	110.50	9.25	521.59	0.66	0.38	256	75	70	0.44	0.0	52.6	10.31	2.31	107.5
		119.75		525.11											
Averages					**0.77**		**254**	**73**		**0.44**		**56.8**	**10.32**	**2.31**	**98.6**

Summary of PM_{10} and $PM_{2.5}$ Results
Alt Fuels October

Test	Date	PM_{10}		$PM_{2.5}$	
		Concentration mg/m^3	Emission Rate g/sec	Concentration mg/m^3	Emission Rate g/sec
1	10-Oct-18	2.05	0.547	0.708	0.189
2	12-Oct-18	1.82	0.531	0.868	0.254
3	12-Oct-18	2.60	0.719	1.070	0.296
Average		2.15	0.599	0.882	0.246

Notes:
- Sampling followed US EPA Method 201A
- All referenced concentration values are expressed at dry, 25°C, 101.3 kPa and Actual Oxygen

Method 201A - $PM_{10/2.5}$ Calculations

Date:	10-Oct-18
Client:	St. Marys
Plant:	Bowmanville
Location:	Bowmanville
Test No.:	Test No. 1 Alt Fuels
Test Location:	Main Stack

Project No.: 1804600
Operator: KNE/MP

Cyclone Sampling Parameters		
Cyclone Qs_{ST}	0.37 Rft³/min*	10.6 l/min*
Cyclone Qs_{actual}	0.56 ft³/min	15.8 l/min
Stack Gas Sampling Parameters		
V_{ms}	44.9 Rft³*	1.270 Rm³*
Average Cyclone I Cut Diameter		10.61 µm
Average Cyclone IV Cut Diameter		2.44 µm
Average Isokineticity		100.1 %
Stack Gas Physical Parameters		
B_{ws}	7.7 % v/v	
Average µ	225.4 (dimensionless)	
M_d	30.45 lbs/lbs mole	
M_w	29.49 lbs/lbs mole	
Average T_s	266 °F	130 °C
Average U_s	55.5 ft/s	16.9 m/s
Stack Area	254.4 ft²	23.64 m²
Actual Q_s	846553 ACFM	399.5 m³/s
Wet Reference Q_s	613928 SCFM*	289.7 Rm³/s*
Dry Reference Q_s	566695 SCFM*	267.5 Rm³/s*
Summary of Particulate Emission Rates		
	Dry Ref. Conc.	**Emission Rate**
Total Part.	8.8941 mg/Rm³*	2.379 g/s
PM_{10} Part.	2.0464 mg/Rm³*	0.547 g/s
$PM_{2.5}$ Part.	0.7084 mg/Rm³*	0.189 g/s

Stack Diameter (m)	5.49
Stack Width (m)	0.00
Stack Breadth (m)	0.00
Stack Area (m^2)	23.64
No. of Traverses	4
No. of Points Per Traverse	3
Data Readings Per Point	1
DGMCF	1.026
Pitot Factor	0.841
Barometric Pressure (" Hg)	29.40
Static Pressure ("H_2O)	-0.70
Oxygen Content (%)	15.6
Carbon Dioxide Content (%)	11.4
Carbon Monoxide Content (PPM)	278
Assumed Moisture (%)	
Nozzle Diameter #1 (inches)	0.175

Impinger Recovery	Impinger 1	Impinger 2	Impinger 3	Impinger 4	
initial volume or weight (ml or mg)	707.3	700.7	619.0	937.1	
final volume or weight (ml or mg)	739.9	712.8	638.7	950.6	
gain in volume or weight (ml or mg)	32.6	12.1	19.7	13.5	
				TOTAL	**77.9**

Particulate Weight Gains	>10µm	<10µm, >2.5µm	<2.5µm	Filter (<2.5µm)
particulate weight gains (mg)	8.70	1.70	<0.50	<0.40

***Reference conditions:25°C, 101.3 KPa**
The lab RDL is used for results that are less than detect

Test Data Page Calculations

Date: 10-Oct-18	Plant: Bowmanville	Test No.: Test No. 1 Alt Fuels	Project No.: 1804600
Client: St. Marys	Location: Bowmanville	Test location: Main Stack	Operator: KNE/MP

Port No.	Point	Clock Time (min)	Dwell Time (min)	Dry Gas Meter (ft^3)	DR ("H_2O)	Desired cfm	Stack Temp (°F)	Meter Temp Outlet (°F)	Meter Temp Inlet (°F)	Meter Pressure DH ("H_2O)	Pump Vacuum Gauge ("Hg)	Stack Gas Velocity (ft/s)	Cyclone I Cut Diam. (mm)	Cyclone IV Cut Diam. (mm)	ISO (%)
Trav 1	1	0.00	10.75	814.80	0.82	0.38	282	83	83	0.45	0.0	60.2	10.53	2.42	96.0
	2	10.75	10.00	818.89	0.70	0.38	279	83	83	0.45	0.0	55.5	10.52	2.42	103.7
	3	20.75	9.25	822.69	0.62	0.38	276	86	84	0.45	0.0	52.1	10.54	2.43	109.5
		30.00		826.20											
Trav 2	1	30.00	10.50	826.20	0.80	0.38	265	90	85	0.45	0.0	58.8	10.56	2.42	95.3
	2	40.50	10.00	830.19	0.72	0.38	267	92	86	0.45	0.0	55.8	10.58	2.43	100.3
	3	50.50	9.25	833.99	0.60	0.38	263	96	90	0.45	0.0	50.8	10.63	2.45	108.7
		59.75		837.51											
Trav 3	1	59.75	10.75	837.51	0.81	0.38	261	98	92	0.45	0.0	59.0	10.65	2.46	93.1
	2	70.50	10.25	841.59	0.74	0.38	260	98	92	0.45	0.0	56.3	10.65	2.45	97.4
	3	80.75	9.75	845.49	0.66	0.38	260	98	92	0.45	0.0	53.2	10.65	2.45	103.1
		90.50		849.19											
Trav 4	1	90.50	10.50	849.19	0.80	0.38	261	100	94	0.45	0.0	58.6	10.68	2.47	93.4
	2	101.00	9.75	853.18	0.69	0.38	260	100	95	0.45	0.0	54.4	10.69	2.47	100.4
	3	110.75	9.25	856.89	0.60	0.38	262	100	95	0.45	0.0	50.8	10.69	2.47	107.8
		120.00		860.40											
Averages					**0.71**		**266**	**91**		**0.45**		**55.5**	**10.61**	**2.44**	**100.1**

Method 201A - $PM_{10/2.5}$ Calculations

Date:	12-Oct-18
Client:	St. Marys
Plant:	Bowmanville
Location:	Bowmanville
Test No.:	Test No. 2 Alt Fuel
Test Location:	Main Stack

Project No.: 1804600
Operator: KNE/MP

Cyclone Sampling Parameters		
Cyclone Qs_{ST}	0.37 Rft³/min*	10.6 l/min*
Cyclone Qs_{actual}	0.54 ft³/min	15.4 l/min
Stack Gas Sampling Parameters		
V_{ms}	44.7 Rft³*	1.267 Rm³*
Average Cyclone I Cut Diameter		10.83 µm
Average Cyclone IV Cut Diameter		2.52 µm
Average Isokineticity		91.2 %
Stack Gas Physical Parameters		
B_{ws}	5.6 % v/v	
Average μ	225.7 (dimensionless)	
M_d	30.26 lbs/lbs mole	
M_w	29.58 lbs/lbs mole	
Average T_s	262 °F	128 °C
Average U_s	59.1 ft/s	18.0 m/s
Stack Area	254.4 ft²	23.64 m²
Actual Q_s	902673 ACFM	426.0 m³/s
Wet Reference Q_s	655933 SCFM*	309.6 Rm³/s*
Dry Reference Q_s	619315 SCFM*	292.3 Rm³/s*
Summary of Particulate Emission Rates		
	Dry Ref. Conc.	**Emission Rate**
Total Part.	6.4730 mg/Rm³*	1.892 g/s
PM_{10} Part.	1.8156 mg/Rm³*	0.531 g/s
$PM_{2.5}$ Part.	0.8683 mg/Rm³*	0.254 g/s

Stack Diameter (m)	5.49
Stack Width (m)	0.00
Stack Breadth (m)	0.00
Stack Area (m^2)	23.64
No. of Traverses	4
No. of Points Per Traverse	3
Data Readings Per Point	1
DGMCF	1.026
Pitot Factor	0.841
Barometric Pressure (" Hg)	29.30
Static Pressure ("H_2O)	-0.70
Oxygen Content (%)	15.4
Carbon Dioxide Content (%)	10.3
Carbon Monoxide Content (PPM)	222
Assumed Moisture (%)	
Nozzle Diameter #1 (inches)	0.175

Impinger Recovery	Impinger 1	Impinger 2	Impinger 3	Impinger 4	
initial volume or weight (ml or mg)	739.9	712.8	638.7	950.6	
final volume or weight (ml or mg)	777.6	722.7	640.9	955.9	
gain in volume or weight (ml or mg)	37.7	9.9	2.2	5.3	
				TOTAL	**55.1**

Particulate Weight Gains	>10µm	<10µm, >2.5µm	<2.5µm	Filter (<2.5µm)
particulate weight gains (mg)	5.90	1.20	0.50	<0.60

***Reference conditions:25°C, 101.3 KPa**
The lab RDL is used for results that are less than detect

Test Data Page Calculations

Date: 12-Oct-18	**Plant:** Bowmanville	**Test No.:** Test No. 2 Alt Fuel	**Project No.:** 1804600
Client: St. Marys	**Location:** Bowmanville	**Test location:** Main Stack	**Operator:** KNE/MP

Port No.	Point	Clock Time (min)	Dwell Time (min)	Dry Gas Meter (ft^3)	DR ("H_2O)	Desired cfm	Stack Temp (°F)	Meter Temp Outlet (°F)	Meter Temp Inlet (°F)	Meter Pressure DH ("H_2O)	Pump Vacuum Gauge ("Hg)	Stack Gas Velocity (ft/s)	Cyclone I Cut Diam. (mm)	Cyclone IV Cut Diam. (mm)	ISO (%)
Trav 1	1	0.00	10.50	860.92	0.90	0.38	264	83	83	0.45	0.0	62.3	10.71	2.48	88.4
	2	10.50	10.25	864.91	0.84	0.38	262	83	83	0.45	0.0	60.1	10.71	2.48	91.4
	3	20.75	9.61	868.81	0.75	0.38	265	86	84	0.45	0.0	56.9	10.74	2.50	96.6
		30.36		872.46											
Trav 2	1	30.36	10.41	872.46	0.88	0.38	264	90	85	0.45	0.0	61.6	10.78	2.51	88.7
	2	40.76	10.05	876.41	0.82	0.38	267	92	86	0.45	0.0	59.6	10.80	2.52	91.8
	3	50.81	9.54	880.23	0.74	0.38	263	96	90	0.45	0.0	56.4	10.85	2.54	95.7
		60.35		883.85											
Trav 3	1	60.35	10.52	883.85	0.90	0.38	261	98	92	0.45	0.0	62.2	10.88	2.54	86.4
	2	70.88	10.41	887.85	0.88	0.38	260	98	92	0.45	0.0	61.4	10.87	2.54	87.3
	3	81.28	9.54	891.81	0.74	0.38	260	98	92	0.45	0.0	56.3	10.87	2.54	95.2
		90.82		895.43											
Trav 4	1	90.82	10.35	895.43	0.87	0.38	261	100	94	0.45	0.0	61.1	10.90	2.56	87.5
	2	101.17	9.61	899.36	0.75	0.38	260	100	95	0.45	0.0	56.7	10.91	2.56	94.1
	3	110.78	9.28	903.02	0.70	0.38	262	100	95	0.45	0.0	54.9	10.91	2.56	97.5
		120.06		906.54											
Averages					**0.81**		**262**	**91**		**0.45**		**59.1**	**10.83**	**2.52**	**91.2**

Method 201A - $PM_{10/2.5}$ Calculations

Date:	12-Oct-18
Client:	St. Marys
Plant:	Bowmanville
Location:	Bowmanville
Test No.:	Test No. 3 Alt Fuel
Test Location:	Main Stack

Project No.: 1804600
Operator: KNE/MP

Cyclone Sampling Parameters		
Cyclone Qs_{ST}	0.39 Rft³/min*	10.9 l/min*
Cyclone Qs_{actual}	0.57 ft³/min	16.1 l/min
Stack Gas Sampling Parameters		
V_{ms}	46.2 Rft³*	1.308 Rm³*
Average Cyclone I Cut Diameter		10.39 µm
Average Cyclone IV Cut Diameter		2.35 µm
Average Isokineticity		100.1 %
Stack Gas Physical Parameters		
B_{ws}	7.3 % v/v	
Average µ	223.6 (dimensionless)	
M_d	30.30 lbs/lbs mole	
M_w	29.40 lbs/lbs mole	
Average T_s	260 °F	127 °C
Average U_s	56.6 ft/s	17.3 m/s
Stack Area	254.4 ft²	23.64 m²
Actual Q_s	864764 ACFM	408.1 m³/s
Wet Reference Q_s	632421 SCFM*	298.5 Rm³/s*
Dry Reference Q_s	586194 SCFM*	276.7 Rm³/s*
Summary of Particulate Emission Rates		
	Dry Ref. Conc.	**Emission Rate**
Total Part.	8.5606 mg/Rm³*	2.368 g/s
PM_{10} Part.	2.5987 mg/Rm³*	0.719 g/s
$PM_{2.5}$ Part.	1.0701 mg/Rm³*	0.296 g/s

Stack Diameter (m)	5.49
Stack Width (m)	0.00
Stack Breadth (m)	0.00
Stack Area (m^2)	23.64
No. of Traverses	4
No. of Points Per Traverse	3
Data Readings Per Point	1
DGMCF	1.026
Pitot Factor	0.841
Barometric Pressure (" Hg)	29.30
Static Pressure ("H_2O)	0.70
Oxygen Content (%)	15.0
Carbon Dioxide Content (%)	10.6
Carbon Monoxide Content (PPM)	234
Assumed Moisture (%)	
Nozzle Diameter #1 (inches)	0.175

Impinger Recovery	**Impinger 1**	**Impinger 2**	**Impinger 3**	**Impinger 4**	
initial volume or weight (ml or mg)	807.6	722.7	640.9	955.9	
final volume or weight (ml or mg)	845.6	745.3	644.2	967.9	
gain in volume or weight (ml or mg)	38.0	22.6	3.3	12.0	
				TOTAL	**75.9**

Particulate Weight Gains	**>10µm**	**<10µm, >2.5µm**	**<2.5µm**	**Filter (<2.5µm)**
particulate weight gains (mg)	7.80	2.00	0.50	<0.90

***Reference conditions:25°C, 101.3 KPa**
The lab RDL is used for results that are less than detect

Test Data Page Calculations

Date: 12-Oct-18	**Plant:** Bowmanville	**Test No.:** Test No. 3 Alt Fuel	**Project No.:** 1804600
Client: St. Marys	**Location:** Bowmanville	**Test location:** Main Stack	**Operator:** KNE/MP

Port No.	Point	Clock Time (min)	Dwell Time (min)	Dry Gas Meter (ft^3)	DR ("H_2O)	Desired cfm	Stack Temp (°F)	Meter Temp Outlet (°F)	Meter Temp Inlet (°F)	Meter Pressure DH ("H_2O)	Pump Vacuum Gauge ("Hg)	Stack Gas Velocity (ft/s)	Cyclone I Cut Diam. (mm)	Cyclone IV Cut Diam. (mm)	ISO (%)
Trav 1	1	0.00	10.50	905.41	0.84	0.37	261	50	50	0.51	0.0	60.1	10.28	2.31	96.0
	2	10.50	10.00	909.30	0.73	0.37	260	53	51	0.51	0.0	56.0	10.31	2.32	102.5
	3	20.50	9.25	913.00	0.64	0.37	261	55	53	0.51	0.0	52.5	10.34	2.33	109.2
				916.42											
Trav 2	1	29.75	10.75	916.42	0.88	0.37	260	55	55	0.50	0.0	61.5	10.35	2.34	92.8
	2	40.50	10.25	920.40	0.80	0.37	261	61	57	0.50	0.0	58.7	10.41	2.36	96.7
	3	50.75	9.50	924.19	0.69	0.37	260	61	57	0.45	0.0	54.5	10.41	2.36	104.0
		60.25		927.70											
Trav 3	1	60.25	10.50	927.70	0.84	0.37	261	61	59	0.45	0.0	60.1	10.43	2.37	94.2
	2	70.75	10.00	931.59	0.73	0.37	260	61	59	0.45	0.0	56.0	10.43	2.37	100.9
	3	80.75	9.25	935.29	0.64	0.37	259	61	59	0.45	0.0	52.4	10.43	2.37	107.7
				938.71											
Trav 4	1	90.00	10.50	938.71	0.84	0.37	259	61	59	0.45	0.0	60.1	10.43	2.37	94.0
	2	100.50	9.75	942.60	0.70	0.37	260	58	58	0.45	0.0	54.9	10.40	2.36	103.5
	3	110.25	9.25	946.20	0.65	0.37	262	59	57	0.45	0.0	52.9	10.40	2.36	107.5
		119.50		949.63											
Averages					**0.75**		**260**	**57**		**0.47**		**56.6**	**10.39**	**2.35**	**100.1**

Summary of PM_{10} and $PM_{2.5}$ Results

Alt Fuels December

Test	Date	PM_{10}		$PM_{2.5}$	
		Concentration mg/m^3	Emission Rate g/sec	Concentration mg/m^3	Emission Rate g/sec
1	4-Dec-18	1.60	0.435	0.685	0.186
2	5-Dec-18	1.89	0.533	0.840	0.237
3	6-Dec-18	2.02	0.556	0.778	0.214
Average		1.84	0.508	0.767	0.212

Notes:

- Sampling followed US EPA Method 201A
- All referenced concentration values are expressed at dry, 25°C, 101.3 kPa and Actual Oxygen

Method 201A - $PM_{10/2.5}$ Calculations

Date:	4-Dec-18
Client:	St. Marys
Plant:	Bowmanville
Location:	Bowmanville
Test No.:	Test No. 1 Alt Fuels
Test Location:	Main Stack

Project No.: 1804600
Operator: KNE/MP

Stack Diameter (m)	5.49
Stack Width (m)	0.00
Stack Breadth (m)	0.00
Stack Area (m^2)	23.64
No. of Traverses	4
No. of Points Per Traverse	3
Data Readings Per Point	1
DGMCF	1.026
Pitot Factor	0.841
Barometric Pressure (" Hg)	29.60
Static Pressure ("H_2O)	-0.70
Oxygen Content (%)	13.2
Carbon Dioxide Content (%)	10.9
Carbon Monoxide Content (PPM)	230
Assumed Moisture (%)	
Nozzle Diameter #1 (inches)	0.175

Cyclone Sampling Parameters		
Cyclone Qs_{ST}	0.38 Rft³/min*	10.8 l/min*
Cyclone Qs_{actual}	0.56 ft³/min	15.9 l/min
Stack Gas Sampling Parameters		
V_{ms}	46.4 Rft³*	1.315 Rm³*
Average Cyclone I Cut Diameter		10.44 µm
Average Cyclone IV Cut Diameter		2.37 µm
Average Isokineticity		101.7 %
Stack Gas Physical Parameters		
B_{ws}	7.5 % v/v	
Average µ	221.8 (dimensionless)	
M_d	30.27 lbs/lbs mole	
M_w	29.36 lbs/lbs mole	
Average T_s	258 °F	126 °C
Average U_s	55.3 ft/s	16.8 m/s
Stack Area	254.4 ft²	23.64 m²
Actual Q_s	843539 ACFM	398.1 m³/s
Wet Reference Q_s	623059 SCFM*	294.1 Rm³/s*
Dry Reference Q_s	576614 SCFM*	272.1 Rm³/s*
Summary of Particulate Emission Rates		
	Dry Ref. Conc.	**Emission Rate**
Total Part.	3.0426 mg/Rm³*	0.828 g/s
PM_{10} Part.	1.5974 mg/Rm³*	0.435 g/s
$PM_{2.5}$ Part.	0.6846 mg/Rm³*	0.186 g/s

Impinger Recovery	Impinger 1	Impinger 2	Impinger 3	Impinger 4
initial volume or weight (ml or mg)	707.3	700.7	619.0	937.1
final volume or weight (ml or mg)	739.9	712.8	638.7	950.6
gain in volume or weight (ml or mg)	32.6	12.1	19.7	13.5

TOTAL **77.9**

Particulate Weight Gains	>10µm	<10µm, >2.5µm	<2.5µm	Filter (<2.5µm)
particulate weight gains (mg)	1.90	1.20	<0.60	<0.30

***Reference conditions:25°C, 101.3 KPa**
The lab RDL is used for results that are less than detect

Test Data Page Calculations

Date: 4-Dec-18	**Plant:** Bowmanville	**Test No.:** Test No. 1 Alt Fuels	**Project No.:** 1804600
Client: St. Marys	**Location:** Bowmanville	**Test location:** Main Stack	**Operator:** KNE/MP

Port No.	Point	Clock Time (min)	Dwell Time (min)	Dry Gas Meter (ft^3)	DR ("H_2O)	Desired cfm	Stack Temp (°F)	Meter Temp Outlet (°F)	Meter Temp Inlet (°F)	Meter Pressure DH ("H_2O)	Pump Vacuum Gauge ("Hg)	Stack Gas Velocity (ft/s)	Cyclone I Cut Diam. (mm)	Cyclone IV Cut Diam. (mm)	ISO (%)
Trav 1	1	0.00	9.50	73.37	0.60	0.35	255	44	44	0.45	0.0	50.5	10.51	2.39	109.1
	2	9.50	9.75	76.70	0.62	0.35	254	45	45	0.44	0.0	51.3	10.53	2.40	107.1
	3	19.25	9.75	80.11	0.62	0.35	259	45	45	0.45	0.0	51.5	10.54	2.41	107.4
		29.00		83.52											
Trav 2	1	29.00	10.00	83.52	0.74	0.35	240	34	28	0.41	0.0	55.5	10.30	2.29	99.8
	2	39.00	10.25	87.02	0.78	0.35	261	34	28	0.41	0.0	57.8	10.33	2.33	98.6
	3	49.25	10.25	90.61	0.78	0.35	263	34	28	0.41	0.0	57.9	10.34	2.33	98.8
		59.50		94.20											
Trav 3	1	59.50	10.25	94.20	0.70	0.35	261	40	40	0.45	0.0	54.8	10.47	2.38	102.3
	2	69.75	10.25	97.78	0.70	0.35	260	40	40	0.45	0.0	54.7	10.46	2.38	102.2
	3	80.00	10.50	101.37	0.72	0.35	260	40	40	0.45	0.0	55.5	10.46	2.38	100.8
		90.50		105.05											
Trav 4	1	90.50	10.25	105.05	0.79	0.35	261	40	40	0.41	0.0	58.2	10.47	2.38	96.3
	2	100.75	10.25	108.63	0.78	0.35	260	40	40	0.41	0.0	57.8	10.46	2.38	96.8
	3	111.00	10.25	112.22	0.78	0.35	262	40	40	0.41	0.0	57.8	10.47	2.38	96.9
		121.25		115.81											
Averages					**0.72**		**258**	**39**		**0.43**		**55.3**	**10.44**	**2.37**	**101.7**

Method 201A - $PM_{10/2.5}$ Calculations

Date:	5-Dec-18
Client:	St. Marys
Plant:	Bowmanville
Location:	Bowmanville
Test No.:	Test No. 2 Alt Fuel
Test Location:	Main Stack

Project No.: 1804600
Operator: KNE/MP

Stack Diameter (m)	5.49
Stack Width (m)	0.00
Stack Breadth (m)	0.00
Stack Area (m^2)	23.64
No. of Traverses	4
No. of Points Per Traverse	3
Data Readings Per Point	1
DGMCF	1.026
Pitot Factor	0.841
Barometric Pressure (" Hg)	29.50
Static Pressure ("H_2O)	-0.70
Oxygen Content (%)	13.3
Carbon Dioxide Content (%)	11.0
Carbon Monoxide Content (PPM)	0
Assumed Moisture (%)	
Nozzle Diameter #1 (inches)	0.175

Cyclone Sampling Parameters		
Cyclone Qs_{ST}	0.28 Rft³/min*	8.0 l/min*
Cyclone Qs_{actual}	0.41 ft³/min	11.7 l/min
Stack Gas Sampling Parameters		
V_{ms}	33.6 Rft³*	.952 Rm³*
Average Cyclone I Cut Diameter		10.57 µm
Average Cyclone IV Cut Diameter		2.41 µm
Average Isokineticity		97.2 %
Stack Gas Physical Parameters		
B_{ws}	7.3 % v/v	
Average μ	222.5 (dimensionless)	
M_d	30.29 lbs/lbs mole	
M_w	29.40 lbs/lbs mole	
Average T_s	256 °F	124 °C
Average U_s	57.5 ft/s	17.5 m/s
Stack Area	254.4 ft²	23.64 m²
Actual Q_s	877471 ACFM	414.1 m³/s
Wet Reference Q_s	644359 SCFM*	304.1 Rm³/s*
Dry Reference Q_s	597368 SCFM*	281.9 Rm³/s*
Summary of Particulate Emission Rates		
	Dry Ref. Conc.	**Emission Rate**
Total Part.	2.9406 mg/Rm³*	0.829 g/s
PM_{10} Part.	1.8904 mg/Rm³*	0.533 g/s
$PM_{2.5}$ Part.	0.8402 mg/Rm³*	0.237 g/s

Impinger Recovery	Impinger 1	Impinger 2	Impinger 3	Impinger 4	
initial volume or weight (ml or mg)	739.9	712.8	638.7	950.6	
final volume or weight (ml or mg)	777.6	722.7	640.9	955.9	
gain in volume or weight (ml or mg)	37.7	9.9	2.2	5.3	
				TOTAL	**55.1**

Particulate Weight Gains	>10µm	<10µm, >2.5µm	<2.5µm	Filter (<2.5µm)
particulate weight gains (mg)	1.00	1.00	0.50	<0.30

***Reference conditions:25°C, 101.3 KPa**
The lab RDL is used for results that are less than detect

Test Data Page Calculations

Date: 5-Dec-18	Plant: Bowmanville	Test No.: Test No. 2 Alt Fuel	Project No.: 1804600
Client: St. Marys	Location: Bowmanville	Test location: Main Stack	Operator: KNE/MP

Port No.	Point	Clock Time (min)	Dwell Time (min)	Dry Gas Meter (ft^3)	DR ("H_2O)	Desired cfm	Stack Temp (°F)	Meter Temp Outlet (°F)	Meter Temp Inlet (°F)	Meter Pressure DH ("H_2O)	Pump Vacuum Gauge ("Hg)	Stack Gas Velocity (ft/s)	Cyclone I Cut Diam. (mm)	Cyclone IV Cut Diam. (mm)	ISO (%)
Trav 1	1	0.00	9.50	17.86	0.72	0.35	255	42	40	0.45	0.0	55.4	10.49	2.39	99.9
	2	9.50	9.75	21.19	0.75	0.35	254	45	45	0.44	0.0	56.5	10.55	2.41	97.1
	3	19.25	10.00	24.60	0.78	0.35	259	45	45	0.45	0.0	57.8	10.74	2.48	94.0
		29.25		28.10											
Trav 2	1	29.25	10.25	28.10	0.80	0.35	261	45	45	0.45	0.0	58.6	10.50	2.37	95.7
	2	39.50	10.00	31.69	0.79	0.35	261	45	45	0.45	0.0	58.2	10.50	2.37	94.4
	3	49.50	9.50	35.19	0.71	0.35	263	40	40	0.45	0.0	55.3	10.54	2.40	98.9
		59.00		38.51											
Trav 3	1	59.00	9.73	38.51	0.73	0.35	261	40	40	0.45	0.0	56.0	10.51	2.38	103.9
	2	68.73	9.80	41.92	0.74	0.35	260	40	40	0.45	0.0	56.3	10.52	2.38	99.3
	3	78.53	10.12	45.34	0.79	0.35	260	40	40	0.45	0.0	58.2	10.52	2.38	97.9
		88.65		49.10											
Trav 4	1	88.65	10.25	49.10	0.76	0.35	244	33	33	0.41	0.0	58.2	10.52	2.38	0.0
	2	98.90	10.25	52.69	0.78	0.35	244	36	33	0.41	0.0	59.3	10.52	2.38	0.0
	3	109.15	10.25	56.27	0.77	0.35	244	36	33	0.41	0.0	60.1	10.52	2.38	0.0
		119.40		59.86											
Averages					**0.76**		**256**	**41**		**0.44**		**57.5**	**10.57**	**2.41**	**97.2**

Method 201A - $PM_{10/2.5}$ Calculations

Date:	6-Dec-18
Client:	St. Marys
Plant:	Bowmanville
Location:	Bowmanville
Test No.:	Test No. 3 Alt Fuels
Test Location:	Main Stack

Project No.: 1804600
Operator: KNE/MP

Stack Diameter (m)	5.49
Stack Width (m)	0.00
Stack Breadth (m)	0.00
Stack Area (m^2)	23.64
No. of Traverses	4
No. of Points Per Traverse	3
Data Readings Per Point	1
DGMCF	1.026
Pitot Factor	0.841
Barometric Pressure (" Hg)	29.50
Static Pressure ("H_2O)	0.70
Oxygen Content (%)	13.5
Carbon Dioxide Content (%)	10.8
Carbon Monoxide Content (PPM)	0
Assumed Moisture (%)	
Nozzle Diameter #1 (inches)	0.175

Cyclone Sampling Parameters		
Cyclone Qs_{ST}	0.38 Rft³/min*	10.7 l/min*
Cyclone Qs_{actual}	0.56 ft³/min	15.7 l/min
Stack Gas Sampling Parameters		
V_{ms}	45.4 Rft³*	1.286 Rm³*
Average Cyclone I Cut Diameter		10.52 µm
Average Cyclone IV Cut Diameter		2.40 µm
Average Isokineticity		99.6 %
Stack Gas Physical Parameters		
B_{ws}	7.4 % v/v	
Average µ	222.5 (dimensionless)	
M_d	30.27 lbs/lbs mole	
M_w	29.36 lbs/lbs mole	
Average T_s	260 °F	127 °C
Average U_s	55.9 ft/s	17.0 m/s
Stack Area	254.4 ft²	23.64 m²
Actual Q_s	853496 ACFM	402.8 m³/s
Wet Reference Q_s	628944 SCFM*	296.8 Rm³/s*
Dry Reference Q_s	582235 SCFM*	274.8 Rm³/s*
Summary of Particulate Emission Rates		
	Dry Ref. Conc.	**Emission Rate**
Total Part.	3.4212 mg/Rm³*	0.940 g/s
PM_{10} Part.	2.0216 mg/Rm³*	0.556 g/s
$PM_{2.5}$ Part.	0.7775 mg/Rm³*	0.214 g/s

Impinger Recovery	Impinger 1	Impinger 2	Impinger 3	Impinger 4
initial volume or weight (ml or mg)	807.6	722.7	640.9	955.9
final volume or weight (ml or mg)	845.6	745.3	644.2	967.9
gain in volume or weight (ml or mg)	38.0	22.6	3.3	12.0
				TOTAL **75.9**

Particulate Weight Gains	>10µm	<10µm, >2.5µm	<2.5µm	Filter (<2.5µm)
particulate weight gains (mg)	1.80	1.60	0.70	<0.30

***Reference conditions:25°C, 101.3 KPa**
The lab RDL is used for results that are less than detect

Test Data Page Calculations

Date: 6-Dec-18	**Plant:** Bowmanville	**Test No.:** Test No. 3 Alt Fuels	**Project No.:** 1804600
Client: St. Marys	**Location:** Bowmanville	**Test location:** Main Stack	**Operator:** KNE/MP

Port No.	Point	Clock Time (min)	Dwell Time (min)	Dry Gas Meter (ft^3)	DR ("H_2O)	Desired cfm	Stack Temp (°F)	Meter Temp Outlet (°F)	Meter Temp Inlet (°F)	Meter Pressure DH ("H_2O)	Pump Vacuum Gauge ("Hg)	Stack Gas Velocity (ft/s)	Cyclone I Cut Diam. (mm)	Cyclone IV Cut Diam. (mm)	ISO (%)
Trav 1	1	0.00	9.50	60.05	0.68	0.35	255	42	40	0.45	0.0	53.7	10.50	2.39	102.7
	2	9.50	9.75	63.38	0.70	0.35	254	45	45	0.44	0.0	54.5	10.56	2.41	100.4
	3	19.25	9.75	66.79	0.70	0.35	259	45	45	0.45	0.0	54.7	10.57	2.42	100.7
				70.20											
Trav 2	1	29.00	10.00	70.20	0.74	0.35	261	45	45	0.45	0.0	56.3	10.57	2.42	98.1
	2	39.00	10.25	73.70	0.76	0.35	261	45	45	0.45	0.0	57.0	10.57	2.42	96.8
	3	49.25	10.25	77.29	0.76	0.35	263	40	40	0.45	0.0	57.1	10.50	2.40	97.9
		59.50		80.88											
Trav 3	1	59.50	9.75	80.88	0.69	0.35	261	40	40	0.45	0.0	54.3	10.50	2.39	102.7
	2	69.25	9.75	84.29	0.70	0.35	260	40	40	0.45	0.0	54.7	10.50	2.39	101.8
	3	79.00	10.00	87.70	0.73	0.35	260	40	40	0.45	0.0	55.9	10.50	2.39	99.7
				91.20											
Trav 4	1	89.00	10.25	91.20	0.76	0.35	261	40	40	0.45	0.0	57.0	10.50	2.39	97.8
	2	99.25	10.25	94.79	0.78	0.35	260	40	40	0.45	0.0	57.8	10.50	2.39	96.4
	3	109.50	10.25	98.38	0.78	0.35	262	40	40	0.45	0.0	57.8	10.50	2.39	96.6
		119.75		101.96											
Averages					**0.73**		**260**	**42**		**0.45**		**55.9**	**10.52**	**2.40**	**99.6**

Summary of PM_{10} and $PM_{2.5}$ Results
Baseline

Test	Date	PM_{10}		$PM_{2.5}$	
		Concentration mg/m^3	Emission Rate g/sec	Concentration mg/m^3	Emission Rate g/sec
1	7-Dec-18	1.43	0.397	0.604	0.167
2	7-Dec-18	1.28	0.357	0.675	0.189
3	8-Dec-18	1.45	0.403	0.608	0.169
Average		1.39	0.386	0.629	0.175

Notes:
- Sampling followed US EPA Method 201A
- All referenced concentration values are expressed at dry, 25°C, 101.3 kPa and Actual Oxygen

Method 201A - $PM_{10/2.5}$ Calculations

Date:	7-Dec-18
Client:	St. Marys
Plant:	Bowmanville
Location:	Bowmanville
Test No.:	Test No. 1 Baseline
Test Location:	Main Stack

Project No.: 1804600
Operator: KNE/MP

Stack Diameter (m)	5.49
Stack Width (m)	0.00
Stack Breadth (m)	0.00
Stack Area (m^2)	23.64
No. of Traverses	4
No. of Points Per Traverse	3
Data Readings Per Point	1
DGMCF	1.026
Pitot Factor	0.841
Barometric Pressure (" Hg)	29.90
Static Pressure ("H_2O)	-0.70
Oxygen Content (%)	13.6
Carbon Dioxide Content (%)	10.6
Carbon Monoxide Content (PPM)	223
Assumed Moisture (%)	
Nozzle Diameter #1 (inches)	0.175

Cyclone Sampling Parameters		
Cyclone Qs_{ST}	0.39 Rft³/min*	11.0 l/min*
Cyclone Qs_{actual}	0.57 ft³/min	16.0 l/min
Stack Gas Sampling Parameters		
V_{ms}	46.8 Rft³*	1.324 Rm³*
Average Cyclone I Cut Diameter		10.30 μm
Average Cyclone IV Cut Diameter		2.30 μm
Average Isokineticity		101.5 %
Stack Gas Physical Parameters		
B_{ws}	8.2 % v/v	
Average m	220.3 (dimensionless)	
M_d	30.24 lbs/lbs mole	
M_w	29.24 lbs/lbs mole	
Average T_s	254 °F	123 °C
Average U_s	55.8 ft/s	17.0 m/s
Stack Area	254.4 ft²	23.64 m²
Actual Q_s	851488 ACFM	401.9 m³/s
Wet Reference Q_s	638726 SCFM*	301.4 Rm³/s*
Dry Reference Q_s	586479 SCFM*	276.8 Rm³/s*
Summary of Particulate Emission Rates		
	Dry Ref. Conc.	**Emission Rate**
Total Part.	3.3221 mg/Rm³*	0.920 g/s
PM_{10} Part.	1.4345 mg/Rm³*	0.397 g/s
$PM_{2.5}$ Part.	0.6040 mg/Rm³*	0.167 g/s

Impinger Recovery	Impinger 1	Impinger 2	Impinger 3	Impinger 4	
initial volume or weight (ml or mg)	748.3	745.3	644.2	843.2	
final volume or weight (ml or mg)	761.0	785.1	658.7	863.0	
gain in volume or weight (ml or mg)	12.7	39.8	14.5	19.8	
				TOTAL	**86.8**

Particulate Weight Gains	>10mm	<10mm, >2.5mm	<2.5mm	Filter (<2.5μm)
particulate weight gains (mg)	2.50	1.10	<0.50	<0.30

***Reference conditions:25°C, 101.3 KPa**
The lab RDL is used for results that are less than detect

Test Data Page Calculations

Date: 7-Dec-18	**Plant:** Bowmanville	**Test No.:** Test No. 1 Baseline	**Project No.:** 1804600
Client: St. Marys	**Location:** Bowmanville	**Test location:** Main Stack	**Operator:** KNE/MP

Port No.	Point	Clock Time (min)	Dwell Time (min)	Dry Gas Meter (ft^3)	DR ("H_2O)	Desired cfm	Stack Temp (°F)	Meter Temp Outlet (°F)	Meter Temp Inlet (°F)	Meter Pressure DH ("H_2O)	Pump Vacuum Gauge ("Hg)	Stack Gas Velocity (ft/s)	Cyclone I Cut Diam. (mm)	Cyclone IV Cut Diam. (mm)	ISO (%)
Trav 1	1	0.00	9.75	110.57	0.69	0.35	241	34	27	0.41	0.0	53.4	10.21	2.26	104.7
	2	9.75	9.75	113.98	0.71	0.35	241	34	27	0.41	0.0	54.2	10.21	2.26	103.2
	3	19.50	9.75	117.40	0.70	0.35	240	34	27	0.41	0.0	53.8	10.21	2.26	103.8
				120.81											
Trav 2	1	29.25	10.00	120.81	0.74	0.35	240	34	28	0.41	0.0	55.3	10.21	2.26	100.9
	2	39.25	10.25	124.31	0.78	0.35	261	34	28	0.41	0.0	57.6	10.25	2.29	99.7
	3	49.50	10.25	127.90	0.78	0.35	263	34	28	0.41	0.0	57.7	10.25	2.30	99.9
		59.75		131.48											
Trav 3	1	59.75	9.50	131.48	0.66	0.35	261	40	40	0.41	0.0	53.0	10.38	2.34	106.5
	2	69.25	10.00	134.81	0.72	0.35	260	40	40	0.41	0.0	55.3	10.38	2.34	101.9
	3	79.25	10.00	138.31	0.73	0.35	260	40	40	0.41	0.0	55.7	10.38	2.34	101.2
				141.81											
Trav 4	1	89.25	10.25	141.81	0.79	0.35	261	40	40	0.41	0.0	58.0	10.38	2.34	97.3
	2	99.50	10.25	145.40	0.78	0.35	260	40	40	0.41	0.0	57.6	10.38	2.34	97.9
	3	109.75	10.25	148.98	0.78	0.35	262	40	40	0.41	0.0	57.7	10.39	2.35	98.0
		120.00		152.57											
Averages					**0.74**		**254**	**35**		**0.41**		**55.8**	**10.30**	**2.30**	**101.5**

Method 201A - $PM_{10/2.5}$ Calculations

Date:	7-Dec-18
Client:	St. Marys
Plant:	Bowmanville
Location:	Bowmanville
Test No.:	Test No. 2 Baseline
Test Location:	Main Stack

Project No.: 1804600
Operator: KNE/MP

Stack Diameter (m)	5.49
Stack Width (m)	0.00
Stack Breadth (m)	0.00
Stack Area (m^2)	23.64
No. of Traverses	4
No. of Points Per Traverse	3
Data Readings Per Point	1
DGMCF	1.026
Pitot Factor	0.841
Barometric Pressure (" Hg)	29.90
Static Pressure ("H_2O)	0.70
Oxygen Content (%)	14.1
Carbon Dioxide Content (%)	10.7
Carbon Monoxide Content (PPM)	0
Assumed Moisture (%)	
Nozzle Diameter #1 (inches)	0.175

Cyclone Sampling Parameters		
Cyclone Qs_{ST}	0.39 Rft³/min*	11.1 l/min*
Cyclone Qs_{actual}	0.56 ft³/min	15.8 l/min
Stack Gas Sampling Parameters		
V_{ms}	47.1 Rft³*	1.333 Rm³*
Average Cyclone I Cut Diameter		10.29 µm
Average Cyclone IV Cut Diameter		2.29 µm
Average Isokineticity		101.0 %
Stack Gas Physical Parameters		
B_{ws}	7.9 % v/v	
Average m	218.6 (dimensionless)	
M_d	30.28 lbs/lbs mole	
M_w	29.31 lbs/lbs mole	
Average T_s	245 °F	118 °C
Average U_s	55.3 ft/s	16.9 m/s
Stack Area	254.4 ft²	23.64 m²
Actual Q_s	844459 ACFM	398.5 m³/s
Wet Reference Q_s	643827 SCFM*	303.9 Rm³/s*
Dry Reference Q_s	593123 SCFM*	279.9 Rm³/s*
Summary of Particulate Emission Rates		
	Dry Ref. Conc.	**Emission Rate**
Total Part.	2.7766 mg/Rm³*	0.777 g/s
PM_{10} Part.	1.2757 mg/Rm³*	0.357 g/s
$PM_{2.5}$ Part.	0.6754 mg/Rm³*	0.189 g/s

Impinger Recovery	Impinger 1	Impinger 2	Impinger 3	Impinger 4	
initial volume or weight (ml or mg)	781.0	785.1	658.7	863.0	
final volume or weight (ml or mg)	808.0	820.0	668.8	874.8	
gain in volume or weight (ml or mg)	27.0	34.9	10.1	11.8	
				TOTAL	**83.8**

Particulate Weight Gains	>10mm	<10mm, >2.5mm	<2.5mm	Filter (<2.5µm)
particulate weight gains (mg)	2.00	0.80	0.60	<0.30

***Reference conditions:25°C, 101.3 KPa**
The lab RDL is used for results that are less than detect

Test Data Page Calculations

Date: 7-Dec-18	**Plant:** Bowmanville	**Test No.:** Test No. 2 Baseline	**Project No.:** 1804600
Client: St. Marys	**Location:** Bowmanville	**Test location:** Main Stack	**Operator:** KNE/MP

Port No.	Point	Clock Time (min)	Dwell Time (min)	Dry Gas Meter (ft^3)	DR ("H_2O)	Desired cfm	Stack Temp (°F)	Meter Temp Outlet (°F)	Meter Temp Inlet (°F)	Meter Pressure DH ("H_2O)	Pump Vacuum Gauge ("Hg)	Stack Gas Velocity (ft/s)	Cyclone I Cut Diam. (mm)	Cyclone IV Cut Diam. (mm)	ISO (%)
Trav 1	1	0.00	9.50	153.01	0.66	0.35	243	34	31	0.41	0.0	52.2	10.29	2.29	106.3
	2	9.50	9.75	156.34	0.72	0.35	241	31	31	0.41	0.0	54.4	10.27	2.28	102.0
	3	19.25	10.00	159.75	0.74	0.35	243	31	31	0.41	0.0	55.3	10.27	2.28	100.7
				163.25											
Trav 2	1	29.25	10.25	163.25	0.78	0.35	244	31	31	0.41	0.0	56.8	10.27	2.28	98.2
	2	39.50	10.50	166.84	0.80	0.35	243	31	31	0.41	0.0	57.5	10.27	2.28	96.9
	3	50.00	10.00	170.51	0.75	0.35	263	31	31	0.41	0.0	56.4	10.31	2.31	101.4
		60.00		174.01											
Trav 3	1	60.00	9.50	174.01	0.66	0.35	244	31	32	0.41	0.0	52.2	10.28	2.28	106.6
	2	69.50	9.75	177.34	0.72	0.35	244	33	32	0.41	0.0	54.5	10.30	2.29	101.9
	3	79.25	10.00	180.75	0.74	0.35	244	33	32	0.41	0.0	55.3	10.30	2.29	100.5
				184.25											
Trav 4	1	89.25	10.25	184.25	0.76	0.35	244	33	33	0.41	0.0	56.0	10.30	2.29	99.0
	2	99.50	10.25	187.84	0.78	0.35	244	36	33	0.41	0.0	56.8	10.33	2.30	97.5
	3	109.75	10.25	191.42	0.77	0.35	244	36	33	0.41	0.0	56.4	10.33	2.30	98.1
		120.00		195.01											
Averages					**0.74**		**245**	**32**		**0.41**		**55.3**	**10.29**	**2.29**	**101.0**

Method 201A - $PM_{10/2.5}$ Calculations

Date:	8-Dec-18
Client:	St. Marys
Plant:	Bowmanville
Location:	Bowmanville
Test No.:	Test No. 3 Baseline
Test Location:	Main Stack

Project No.: 1804600
Operator: KNE/MP

Stack Diameter (m)	5.49
Stack Width (m)	0.00
Stack Breadth (m)	0.00
Stack Area (m^2)	23.64
No. of Traverses	4
No. of Points Per Traverse	3
Data Readings Per Point	1
DGMCF	1.026
Pitot Factor	0.841
Barometric Pressure (" Hg)	29.90
Static Pressure ("H_2O)	0.70
Oxygen Content (%)	14.2
Carbon Dioxide Content (%)	10.6
Carbon Monoxide Content (PPM)	0
Assumed Moisture (%)	
Nozzle Diameter #1 (inches)	0.175

Cyclone Sampling Parameters		
Cyclone Qs_{ST}	0.39 Rft³/min*	11.0 l/min*
Cyclone Qs_{actual}	0.56 ft³/min	15.7 l/min
Stack Gas Sampling Parameters		
V_{ms}	46.4 Rft³*	1.315 Rm³*
Average Cyclone I Cut Diameter		10.41 µm
Average Cyclone IV Cut Diameter		2.33 µm
Average Isokineticity		100.5 %
Stack Gas Physical Parameters		
B_{ws}	7.8 % v/v	
Average m	220.0 (dimensionless)	
M_d	30.26 lbs/lbs mole	
M_w	29.31 lbs/lbs mole	
Average T_s	250 °F	121 °C
Average U_s	55.4 ft/s	16.9 m/s
Stack Area	254.4 ft²	23.64 m²
Actual Q_s	845550 ACFM	399.1 m³/s
Wet Reference Q_s	640044 SCFM*	302.1 Rm³/s*
Dry Reference Q_s	590193 SCFM*	278.5 Rm³/s*
Summary of Particulate Emission Rates		
	Dry Ref. Conc.	**Emission Rate**
Total Part.	3.1943 mg/Rm³*	0.890 g/s
PM_{10} Part.	1.4450 mg/Rm³*	0.403 g/s
$PM_{2.5}$ Part.	0.6084 mg/Rm³*	0.169 g/s

Impinger Recovery	Impinger 1	Impinger 2	Impinger 3	Impinger 4	
initial volume or weight (ml or mg)	748.6	775.2	668.8	813.5	
final volume or weight (ml or mg)	758.4	804.5	687.8	837.1	
gain in volume or weight (ml or mg)	9.8	29.3	19.0	23.6	
				TOTAL	**81.7**

Particulate Weight Gains	>10mm	<10mm, >2.5mm	<2.5mm	Filter (<2.5µm)
particulate weight gains (mg)	2.30	1.10	0.50	<0.30

***Reference conditions:25°C, 101.3 KPa**
The lab RDL is used for results that are less than detect

Test Data Page Calculations

Date: 7-Dec-18	**Plant:** Bowmanville	**Test No.:** Test No. 3 Baseline	**Project No.:** 1804600
Client: St. Marys	**Location:** Bowmanville	**Test location:** Main Stack	**Operator:** KNE/MP

Port No.	Point	Clock Time (min)	Dwell Time (min)	Dry Gas Meter (ft^3)	DR ("H_2O)	Desired cfm	Stack Temp (°F)	Meter Temp Outlet (°F)	Meter Temp Inlet (°F)	Meter Pressure DH ("H_2O)	Pump Vacuum Gauge ("Hg)	Stack Gas Velocity (ft/s)	Cyclone I Cut Diam. (mm)	Cyclone IV Cut Diam. (mm)	ISO (%)
Trav 1	1	0.00	9.50	195.20	0.68	0.35	248	30	29	0.41	0.0	53.2	10.27	2.28	105.7
	2	9.50	9.75	198.53	0.70	0.35	248	30	29	0.41	0.0	53.9	10.27	2.28	104.1
	3	19.25	10.00	201.94	0.73	0.35	248	30	29	0.41	0.0	55.1	10.27	2.28	102.0
				205.44											
Trav 2	1	29.25	10.25	205.44	0.77	0.35	249	32	32	0.41	0.0	56.6	10.31	2.30	98.9
	2	39.50	10.25	209.03	0.79	0.35	250	34	34	0.41	0.0	57.4	10.34	2.31	97.3
	3	49.75	10.50	212.61	0.80	0.35	250	36	36	0.41	0.0	57.7	10.37	2.32	96.3
		60.25		216.29											
Trav 3	1	60.25	9.50	216.29	0.66	0.35	250	40	40	0.41	0.0	52.4	10.43	2.35	105.1
	2	69.75	9.75	219.61	0.70	0.35	251	40	40	0.41	0.0	54.0	10.43	2.35	102.2
	3	79.50	9.75	223.03	0.70	0.35	251	46	40	0.41	0.0	54.0	10.47	2.37	101.6
				226.44											
Trav 4	1	89.25	10.00	226.44	0.75	0.35	252	48	48	0.41	0.0	56.0	10.55	2.40	97.2
	2	99.25	10.25	229.94	0.78	0.35	253	53	50	0.41	0.0	57.1	10.60	2.42	94.7
	3	109.50	10.25	233.53	0.78	0.35	252	53	50	0.41	0.0	57.1	10.60	2.42	94.7
		119.75		237.11											
Averages					**0.74**		**250**	**38**		**0.41**		**55.4**	**10.41**	**2.33**	**100.5**

APPENDIX F

Summary of CEM Data

Kiln Stack, Baseline

O_2 (%)	CO_2 (%)
15.1	11.8

Test ID: Date: 30-Sep-18

Time	O_2 (%)	CO_2 (%)
12:06 to 16:25	15.3	11.4

Test ID: Date: Oct 1 2018

Time	O_2 (%)	CO_2 (%)
8:57 to 12:16	14.9	11.9

Test ID: Date: 2-Oct-18

Time	O_2 (%)	CO_2 (%)
8:08 to 12:29	15.1	12.2

Test 1 **Kiln Stack**				
Date	30-Sep-18			
Analyzer	**O_2**		**CO_2**	
Low				
Zero Value *(Cv)*	0.0		0.0	
Direct *(C Dir)*	0		0	
Calibration Error *(ACE)*	0.00%	*PASS*	0.00%	*PASS*
System Initial *(Csi)*	0.01		0.00	
System Post *(Csf)*	0.01		0.02	
Average *(Co)*	0.01		0.01	
System Bias Initial *(SBi)*	0.0%	*PASS*	0.0%	*PASS*
System Bias Post *(SBf)*	0.0%	*PASS*	0.1%	*PASS*
Drift Assessment *(D)*	0.00%	*PASS*	0.10%	*PASS*
Mid				
Mid Value *(Cv)*	10.0		10.30	
Direct *(C Dir)*	10.0		10.3	
Calibration Error *(ACE)*	0.00%	*PASS*	0.00%	*PASS*
System Initial *(Csi)*	9.95		10.3	
System Post *(Csf)*	10.02		10.3	
Average *(Cm)*	10.0		10.3	
System Bias Initial *(SBi)*	-0.2%	*PASS*	0.0%	*PASS*
System Bias Post *(SBf)*	0.1%	*PASS*	0.0%	*PASS*
Drift Assessment *(D)*	0.33%	*PASS*	0.00%	*PASS*
High				
High Value *(CS/Cv)*	21.00		20.0	
Direct *(C Dir)*	20.85		20.1	
Calibration Error *(ACE)*	-0.71%	*PASS*	0.50%	*PASS*
System Initial *(Csi)*				
System Post *(Csf)*				
Average *(Cm)*	-		-	
System Bias Initial *(SBi)*	N/A	-	N/A	-
System Bias Post *(SBf)*	N/A	-	N/A	-
Drift Assessment *(D)*	N/A	-	N/A	-
Analyser Span (Range)	25		20	
Average	15.27	15.30	11.39	11.39
Time	**Recorded**	**Corrected**	**Recorded**	**Corrected**
12:06:00	15.4277	15.46	11.2698	11.27
12:07:00	15.417	15.45	11.2923	11.29
12:08:00	15.4203	15.45	11.2932	11.29
12:09:00	15.442	15.47	11.2726	11.27
12:10:00	15.3635	15.39	11.3262	11.33
12:11:00	15.3573	15.39	11.3326	11.33
12:12:00	15.3257	15.35	11.3799	11.38
12:13:00	15.3254	15.35	11.3714	11.37
12:14:00	15.3056	15.33	11.3877	11.39
12:15:00	15.2434	15.27	11.4479	11.45
12:16:00	15.1971	15.23	11.4798	11.48
12:17:00	15.2897	15.32	11.4352	11.44
12:18:00	15.1848	15.21	11.5116	11.51
12:19:00	15.2258	15.25	11.4758	11.48
12:20:00	15.1738	15.20	11.5253	11.53
12:21:00	15.2086	15.24	11.5068	11.51
12:22:00	15.2041	15.23	11.5075	11.51
12:23:00	15.2059	15.23	11.508	11.51
12:24:00	15.1703	15.20	11.5113	11.51
12:25:00	15.1784	15.21	11.5068	11.51
12:26:00	15.1745	15.20	11.5064	11.51
12:27:00	15.2285	15.26	11.4776	11.48
12:28:00	15.1913	15.22	11.4915	11.49
12:29:00	15.2144	15.24	11.4651	11.47
12:30:00	15.1811	15.21	11.5039	11.51
12:31:00	15.2494	15.28	11.4503	11.45
12:32:00	15.2013	15.23	11.4502	11.45
12:33:00	15.227	15.26	11.4407	11.44
12:34:00	15.1283	15.16	11.5096	11.51
12:35:00	15.1469	15.17	11.5043	11.51
12:36:00	15.149	15.18	11.5076	11.51
12:37:00	15.0923	15.12	11.5335	11.53
12:38:00	15.187	15.22	11.4681	11.47
12:39:00	15.1019	15.13	11.517	11.52
12:40:00	15.2037	15.23	11.4478	11.45
12:41:00	15.2925	15.32	11.394	11.40
12:42:00	15.205	15.23	11.4608	11.46
12:43:00	15.2565	15.28	11.4358	11.44
12:44:00	15.1793	15.21	11.4924	11.49
12:45:00	15.2282	15.26	11.4564	11.46
12:46:00	15.2692	15.30	11.4182	11.42
12:47:00	15.2903	15.32	11.3895	11.39
12:48:00	15.3453	15.37	11.3309	11.33
12:49:00	15.405	15.43	11.2791	11.28
12:50:00	15.4224	15.45	11.2371	11.24

Test 1 **Kiln Stack**				
Date	30-Sep-18			
Analyzer	**O_2**		**CO_2**	
Low				
12:51:00	15.4566	15.49	11.2023	11.20
12:52:00	15.4884	15.52	11.1685	11.17
12:53:00	15.3824	15.41	11.2361	11.24
12:54:00	15.3919	15.42	11.2229	11.22
12:55:00	15.3215	15.35	11.287	11.29
12:56:00	15.341	15.37	11.2715	11.27
12:57:00	15.2591	15.29	11.337	11.34
12:58:00	15.2418	15.27	11.3489	11.35
12:59:00	15.2769	15.31	11.3201	11.32
13:00:00	15.3169	15.35	11.29	11.29
13:01:00	15.288	15.32	11.2894	11.29
13:02:00	15.3386	15.37	11.2643	11.27
13:03:00	15.2635	15.29	11.306	11.31
13:04:00	15.3043	15.33	11.2648	11.27
13:05:00	15.301	15.33	11.2681	11.27
13:06:00	15.3218	15.35	11.2428	11.24
13:07:00	15.2769	15.31	11.2858	11.29
13:08:00	15.2833	15.31	11.2956	11.30
13:09:00	15.2516	15.28	11.3158	11.32
13:10:00	15.2792	15.31	11.3117	11.31
13:11:00	15.2557	15.28	11.3427	11.34
13:12:00	15.2917	15.32	11.335	11.34
13:13:00	15.2388	15.27	11.3942	11.40
13:14:00	15.2154	15.24	11.4315	11.43
13:15:00	15.0945	15.12	11.5514	11.55
13:16:00	15.2168	15.24	11.4465	11.45
13:17:00	15.2214	15.25	11.4245	11.43
13:18:00	15.3271	15.36	11.3508	11.35
13:19:00	15.3251	15.35	11.3403	11.34
13:20:00	15.3458	15.37	11.332	11.33
13:21:00	15.2548	15.28	11.3956	11.40
13:22:00	15.2817	15.31	11.391	11.39
13:23:00	15.3376	15.37	11.3471	11.35
13:24:00	15.2875	15.32	11.3803	11.38
13:25:00	15.2385	15.27	11.405	11.41
13:26:00	15.3245	15.35	11.3436	11.34
13:27:00	15.3149	15.34	11.3377	11.34
13:28:00	15.3065	15.33	11.3347	11.34
13:29:00	15.2755	15.30	11.3622	11.36
13:30:00	15.207	15.24	11.4135	11.41
13:31:00	15.2553	15.28	11.3832	11.38
13:32:00	15.2296	15.26	11.3885	11.39
13:33:00	15.2302	15.26	11.3772	11.38
13:34:00	15.1995	15.23	11.4027	11.40
13:35:00	15.1704	15.20	11.4051	11.41
13:36:00	15.224	15.25	11.3738	11.37
13:37:00	15.2411	15.27	11.3377	11.34
13:38:00	15.2456	15.27	11.3189	11.32
13:39:00	15.2759	15.30	11.3045	11.31
13:40:00	15.1971	15.23	11.351	11.35
13:41:00	15.2061	15.23	11.331	11.33
13:42:00	15.1925	15.22	11.3309	11.33
13:43:00	15.2365	15.26	11.2869	11.29
13:44:00	15.2601	15.29	11.2734	11.27
13:45:00	15.2459	15.27	11.2645	11.27
13:46:00	15.2723	15.30	11.2289	11.23
13:47:00	15.281	15.31	11.2153	11.22
13:48:00	15.2269	15.26	11.2519	11.25
13:49:00	15.2864	15.31	11.2023	11.20
13:50:00	15.285	15.31	11.1931	11.19
13:51:00	15.364	15.39	11.1254	11.13
13:52:00	15.387	15.42	11.11	11.11
13:53:00	15.3453	15.37	11.1207	11.12
13:54:00	15.3548	15.38	11.0937	11.09
13:55:00	15.4011	15.43	11.0662	11.07
13:56:00	15.426	15.45	11.0266	11.03
13:57:00	15.4802	15.51	10.9849	10.99
13:58:00	15.4108	15.44	11.0244	11.03
13:59:00	15.3807	15.41	11.0316	11.03
14:00:00	15.3631	15.39	11.0487	11.05
14:01:00	15.2813	15.31	11.1128	11.11
14:02:00	15.2697	15.30	11.1069	11.11
14:03:00	15.2216	15.25	11.155	11.16
14:04:00	15.282	15.31	11.1017	11.10
14:05:00	15.3537	15.38	11.0499	11.05

Test 1 **Kiln Stack**				
Date	30-Sep-18			
Analyzer	O_2		CO_2	
Low				
14:06:00	15.3249	15.35	11.0629	11.06
14:07:00	15.3119	15.34	11.0752	11.08
14:08:00	15.3119	15.34	11.0863	11.09
14:09:00	15.2454	15.27	11.1418	11.14
14:10:00	15.2556	15.28	11.136	11.14
14:11:00	15.2735	15.30	11.1343	11.14
14:12:00	15.4022	15.43	11.0265	11.03
14:13:00	15.3106	15.34	11.1012	11.10
14:14:00	15.2901	15.32	11.1255	11.13
14:15:00	15.2607	15.29	11.1452	11.15
14:16:00	15.3199	15.35	11.1114	11.11
14:17:00	15.1955	15.22	11.1945	11.20
14:18:00	15.2492	15.28	11.156	11.16
14:19:00	15.2477	15.28	11.1843	11.19
14:20:00	15.2057	15.23	11.2407	11.24
14:21:00	15.1549	15.18	11.3182	11.32
14:22:00	15.1149	15.14	11.3694	11.37
14:23:00	15.1503	15.18	11.346	11.35
14:24:00	15.1377	15.17	11.3824	11.38
14:25:00	15.1104	15.14	11.4135	11.41
14:26:00	15.2082	15.24	11.3541	11.36
14:27:00	15.1644	15.19	11.3804	11.38
14:28:00	15.1511	15.18	11.4078	11.41
14:29:00	15.1604	15.19	11.4153	11.42
14:30:00	15.187	15.22	11.4037	11.40
14:31:00	15.2416	15.27	11.3514	11.35
14:32:00	15.2954	15.32	11.309	11.31
14:33:00	15.1897	15.22	11.3789	11.38
14:34:00	15.2565	15.28	11.3286	11.33
14:35:00	15.2462	15.27	11.3295	11.33
14:36:00	15.2786	15.31	11.3001	11.30
14:37:00	15.2583	15.29	11.3229	11.32
14:38:00	15.1656	15.19	11.3849	11.39
14:39:00	15.1811	15.21	11.37	11.37
14:40:00	15.2269	15.26	11.326	11.33
14:41:00	15.2094	15.24	11.3216	11.32
14:42:00	15.2289	15.26	11.3153	11.32
14:43:00	15.1168	15.14	11.3871	11.39
14:44:00	15.1429	15.17	11.3642	11.37
14:45:00	15.159	15.19	11.3618	11.36
14:46:00	15.161	15.19	11.3478	11.35
14:47:00	15.147	15.17	11.3414	11.34
14:48:00	15.1336	15.16	11.3649	11.37
14:49:00	15.1999	15.23	11.3012	11.30
14:50:00	15.2971	15.33	11.2325	11.23
14:51:00	15.3165	15.34	11.2095	11.21
14:52:00	15.3793	15.41	11.1649	11.17
14:53:00	15.3263	15.35	11.2189	11.22
14:54:00	15.3573	15.39	11.1967	11.20
14:55:00	15.3622	15.39	11.1812	11.18
14:56:00	15.3599	15.39	11.1946	11.20
14:57:00	15.3892	15.42	11.165	11.17
14:58:00	15.4392	15.47	11.1297	11.13
14:59:00	15.4336	15.46	11.114	11.11
15:00:00	15.4171	15.45	11.1266	11.13
15:01:00	15.461	15.49	11.1057	11.11
15:02:00	15.4452	15.47	11.1099	11.11
15:03:00	15.5341	15.56	11.0499	11.05
15:04:00	15.3913	15.42	11.169	11.17
15:05:00	15.3655	15.39	11.1762	11.18
15:06:00	15.4264	15.46	11.1369	11.14
15:07:00	15.4094	15.44	11.1362	11.14
15:08:00	15.5075	15.54	11.0432	11.04
15:09:00	15.5317	15.56	11.0335	11.03
15:10:00	15.3963	15.42	11.1197	11.12
15:11:00	15.4768	15.51	11.0551	11.06
15:12:00	15.4786	15.51	11.0631	11.06
15:13:00	15.5107	15.54	11.0265	11.03
15:14:00	15.5501	15.58	10.9971	11.00
15:15:00	15.5627	15.59	10.9983	11.00
15:16:00	15.5014	15.53	11.0385	11.04
15:17:00	15.4879	15.52	11.0635	11.06
15:18:00	15.4754	15.50	11.0689	11.07
15:19:00	15.5684	15.60	10.988	10.99
15:20:00	15.5357	15.56	10.9947	11.00

Test 1 Kiln Stack				
Date	30-Sep-18			
Analyzer	O_2		CO_2	
Low				
15:21:00	15.6389	15.67	10.9217	10.92
15:22:00	15.6548	15.68	10.9177	10.92
15:23:00	15.591	15.62	10.9665	10.97
15:24:00	15.5826	15.61	10.9569	10.96
15:25:00	15.5331	15.56	11.0045	11.01
15:26:00	15.5334	15.56	11.0119	11.01
15:27:00	15.566	15.59	10.9861	10.99
15:28:00	15.5264	15.56	11.0163	11.02
15:29:00	15.5186	15.55	11.031	11.03
15:30:00	15.562	15.59	11.0067	11.01
15:31:00	15.494	15.52	11.0682	11.07
15:32:00	15.5635	15.59	11.0355	11.04
15:33:00	15.546	15.57	11.0724	11.07
15:34:00	15.4642	15.49	11.1289	11.13
15:35:00	15.4424	15.47	11.1602	11.16
15:36:00	15.411	15.44	11.1826	11.18
15:37:00	15.4797	15.51	11.1392	11.14
15:38:00	15.4014	15.43	11.2139	11.21
15:39:00	15.2986	15.33	11.285	11.29
15:40:00	15.3823	15.41	11.2365	11.24
15:41:00	15.4524	15.48	11.1747	11.18
15:42:00	15.4616	15.49	11.1364	11.14
15:43:00	15.4451	15.47	11.1454	11.15
15:44:00	15.4973	15.53	11.1106	11.11
15:45:00	15.4737	15.50	11.1149	11.12
15:46:00	15.4804	15.51	11.1052	11.11
15:47:00	15.457	15.49	11.1199	11.12
15:48:00	15.4943	15.52	11.0878	11.09
15:49:00	15.4492	15.48	11.1181	11.12
15:50:00	15.4501	15.48	11.1051	11.11
15:51:00	15.4485	15.48	11.1062	11.11
15:52:00	15.4151	15.44	11.1258	11.13
15:53:00	15.4595	15.49	11.0765	11.08
15:54:00	15.483	15.51	11.0606	11.06
15:55:00	15.4856	15.51	11.0435	11.04
15:56:00	15.4686	15.50	11.0303	11.03
15:57:00	15.5039	15.53	10.9907	10.99
15:58:00	15.5367	15.57	10.9657	10.97
15:59:00	15.541	15.57	10.9436	10.94
16:00:00	15.5617	15.59	10.9319	10.93
16:01:00	15.53	15.56	10.9525	10.95
16:02:00	15.5049	15.53	10.966	10.97
16:03:00	15.4944	15.52	10.9719	10.97
16:04:00	15.4594	15.49	10.9936	10.99
16:05:00	15.4544	15.48	11.0012	11.00
16:06:00	15.4253	15.45	11.0255	11.03
16:07:00	15.3773	15.41	11.0576	11.06
16:08:00	15.4121	15.44	11.0499	11.05
16:09:00	15.3741	15.40	11.0733	11.07
16:10:00	15.3822	15.41	11.0533	11.05
16:11:00	15.4467	15.48	11.0194	11.02
16:12:00	15.4379	15.47	11.0154	11.02
16:13:00	15.4827	15.51	10.9881	10.99
16:14:00	15.3765	15.41	11.0497	11.05
16:15:00	15.4677	15.50	10.9955	11.00
16:16:00	15.4324	15.46	11.0271	11.03
16:17:00	15.4334	15.46	11.0193	11.02
16:18:00	15.4285	15.46	11.033	11.03
16:19:00	15.376	15.40	11.0736	11.07
16:20:00	15.41	15.44	11.0304	11.03
16:21:00	15.4821	15.51	10.9984	11.00
16:22:00	15.4296	15.46	11.0355	11.04
16:23:00	15.5475	15.58	10.9489	10.95
16:24:00	15.4524	15.48	11.0227	11.02
16:25:00	15.4545	15.48	11.0271	11.03

Test 2 Kiln Stack				
Date	1-Oct-18			
Analyzer	**O_2**		**CO_2**	
Low				
Zero Value *(Cv)*	0.0		0.0	
Direct *(C Dir)*	0		0	
Calibration Error *(ACE)*	0.00%	*PASS*	0.00%	*PASS*
System Initial *(Csi)*	0.01		0.00	
System Post *(Csf)*	0.01		0.02	
Average *(Co)*	0.01		0.01	
System Bias Initial *(SBi)*	0.0%	*PASS*	0.0%	*PASS*
System Bias Post *(SBf)*	0.0%	*PASS*	0.1%	*PASS*
Drift Assessment *(D)*	0.00%	*PASS*	0.10%	*PASS*
Mid				
Mid Value *(Cv)*	10.0		10.30	
Direct *(C Dir)*	10.0		10.3	
Calibration Error *(ACE)*	0.00%	*PASS*	0.00%	*PASS*
System Initial *(Csi)*	9.9		10.31	
System Post *(Csf)*	10.1		10.33	
Average *(Cm)*	10.0		10.31	
System Bias Initial *(SBi)*	-0.5%	*PASS*	0.0%	*PASS*
System Bias Post *(SBf)*	0.5%	*PASS*	0.1%	*PASS*
Drift Assessment *(D)*	0.95%	*PASS*	0.10%	*PASS*
High				
High Value *(CS/Cv)*	21.00		20.0	
Direct *(C Dir)*	20.85		20.1	
Calibration Error *(ACE)*	-0.71%	*PASS*	0.50%	*PASS*
System Initial *(Csi)*				
System Post *(Csf)*				
Average *(Cm)*	-		-	
System Bias Initial *(SBi)*	N/A	-	N/A	-
System Bias Post *(SBf)*	N/A	-	N/A	-
Drift Assessment *(D)*	N/A	-	N/A	-
Analyser Span (Range)	25		20	
Average	14.87	14.87	11.90	11.89
Time	**Recorded**	**Corrected**	**Recorded**	**Corrected**
8:57:00	14.7827	14.79	12.1316	12.12
8:58:00	14.7707	14.78	12.14	12.13
8:59:00	14.7927	14.80	12.1182	12.11
9:00:00	14.7989	14.80	12.122	12.11
9:01:00	14.753	14.76	12.1317	12.12
9:02:00	14.8117	14.82	12.0872	12.08
9:03:00	14.8181	14.82	12.0834	12.07
9:04:00	14.7841	14.79	12.0885	12.08
9:05:00	14.7727	14.78	12.0772	12.07
9:06:00	14.7972	14.80	12.0552	12.05
9:07:00	14.7472	14.75	12.0991	12.09
9:08:00	14.7353	14.74	12.1119	12.10
9:09:00	14.7013	14.71	12.1281	12.12
9:10:00	14.7261	14.73	12.1025	12.09
9:11:00	14.7855	14.79	12.0596	12.05
9:12:00	14.7678	14.77	12.0726	12.06
9:13:00	14.8053	14.81	12.0645	12.05
9:14:00	14.7488	14.75	12.0907	12.08
9:15:00	14.7567	14.76	12.0861	12.08
9:16:00	14.8421	14.85	12.0264	12.02
9:17:00	14.7895	14.79	12.0494	12.04
9:18:00	14.7538	14.76	12.0674	12.06
9:19:00	14.7123	14.72	12.103	12.09
9:20:00	14.7393	14.74	12.0761	12.07
9:21:00	14.7269	14.73	12.0927	12.08
9:22:00	14.6997	14.70	12.0998	12.09
9:23:00	14.758	14.76	12.0326	12.02
9:24:00	14.7468	14.75	12.042	12.03
9:25:00	14.7683	14.77	12.0279	12.02
9:26:00	14.6923	14.70	12.0753	12.07
9:27:00	14.7443	14.75	12.0321	12.02
9:28:00	14.618	14.62	12.1171	12.11
9:29:00	14.6889	14.69	12.0682	12.06
9:30:00	14.6958	14.70	12.0702	12.06
9:31:00	14.6761	14.68	12.0984	12.09
9:32:00	14.7	14.70	12.0829	12.07
9:33:00	14.6798	14.68	12.0935	12.08
9:34:00	14.7416	14.75	12.0597	12.05
9:35:00	14.784	14.79	12.0227	12.01
9:36:00	14.7316	14.74	12.04	12.03
9:37:00	14.7694	14.77	12.0341	12.02
9:38:00	14.776	14.78	12.0095	12.00
9:39:00	14.756	14.76	12.011	12.00
9:40:00	14.7908	14.80	11.9886	11.98
9:41:00	14.7373	14.74	12.0166	12.01

Test 2 **Kiln Stack**				
Date	1-Oct-18			
Analyzer	**O_2**		**CO_2**	
Low				
9:42:00	14.8161	14.82	11.9531	11.94
9:43:00	14.816	14.82	11.9505	11.94
9:44:00	14.8837	14.89	11.8907	11.88
9:45:00	14.8819	14.89	11.878	11.87
9:46:00	14.8054	14.81	11.9261	11.92
9:47:00	14.7411	14.75	11.991	11.98
9:48:00	14.8022	14.81	11.9771	11.97
9:49:00	14.6888	14.69	12.0586	12.05
9:50:00	14.7194	14.72	12.0703	12.06
9:51:00	14.7501	14.75	12.0746	12.06
9:52:00	14.7536	14.76	12.0898	12.08
9:53:00	14.7217	14.73	12.1204	12.11
9:54:00	14.6869	14.69	12.1519	12.14
9:55:00	14.7389	14.74	12.1208	12.11
9:56:00	14.7535	14.76	12.1132	12.10
9:57:00	14.7238	14.73	12.123	12.11
9:58:00	14.6973	14.70	12.1493	12.14
9:59:00	14.7181	14.72	12.1319	12.12
10:00:00	14.7287	14.73	12.1219	12.11
10:01:00	14.7298	14.73	12.1063	12.10
10:02:00	14.6608	14.67	12.153	12.14
10:03:00	14.7741	14.78	12.0839	12.07
10:04:00	14.7247	14.73	12.1011	12.09
10:05:00	14.6734	14.68	12.1263	12.12
10:06:00	14.7578	14.76	12.0686	12.06
10:07:00	14.7564	14.76	12.0528	12.04
10:08:00	14.6614	14.67	12.1093	12.10
10:09:00	14.6933	14.70	12.079	12.07
10:10:00	14.6391	14.64	12.1068	12.10
10:11:00	14.6974	14.70	12.0561	12.05
10:12:00	14.7208	14.73	12.0382	12.03
10:13:00	14.7059	14.71	12.0419	12.03
10:14:00	14.7823	14.79	12.0025	11.99
10:15:00	14.7087	14.71	12.0493	12.04
10:16:00	14.6793	14.68	12.0629	12.05
10:17:00	14.6564	14.66	12.0746	12.06
10:18:00	14.6141	14.62	12.1059	12.10
10:19:00	14.6385	14.64	12.0989	12.09
10:20:00	14.5308	14.54	12.1522	12.14
10:21:00	14.6386	14.64	12.083	12.07
10:22:00	14.6869	14.69	12.0357	12.03
10:23:00	14.5601	14.56	12.1103	12.10
10:24:00	14.6016	14.61	12.1099	12.10
10:25:00	14.5081	14.51	12.1732	12.16
10:26:00	14.457	14.46	12.2165	12.21
10:27:00	14.4425	14.45	12.2236	12.21
10:28:00	14.5011	14.51	12.1659	12.16
10:29:00	14.6219	14.63	12.0671	12.06
10:30:00	14.6698	14.67	12.0232	12.01
10:31:00	14.834	14.84	11.8908	11.88
10:32:00	14.8303	14.84	11.8899	11.88
10:33:00	14.8685	14.87	11.8345	11.82
10:34:00	14.9217	14.93	11.7775	11.77
10:35:00	15.0561	15.06	11.6999	11.69
10:36:00	15.0751	15.08	11.656	11.65
10:37:00	15.1349	15.14	11.6095	11.60
10:38:00	15.1508	15.16	11.5872	11.58
10:39:00	15.1683	15.17	11.5587	11.55
10:40:00	15.2159	15.22	11.5138	11.50
10:41:00	15.2674	15.27	11.4774	11.47
10:42:00	15.2275	15.23	11.4827	11.47
10:43:00	15.166	15.17	11.5308	11.52
10:44:00	15.241	15.25	11.4688	11.46
10:45:00	15.1923	15.20	11.5051	11.50
10:46:00	15.24	15.25	11.463	11.45
10:47:00	15.2111	15.22	11.4739	11.46
10:48:00	15.2679	15.27	11.4395	11.43
10:49:00	15.2598	15.27	11.4382	11.43
10:50:00	15.2371	15.24	11.4497	11.44
10:51:00	15.2585	15.26	11.4493	11.44
10:52:00	15.2384	15.24	11.4624	11.45
10:53:00	15.2241	15.23	11.4882	11.48
10:54:00	15.1881	15.19	11.5234	11.51
10:55:00	15.1528	15.16	11.5534	11.54
10:56:00	15.2012	15.21	11.5319	11.52

Test 2 Kiln Stack				
Date	1-Oct-18			
Analyzer	O_2		CO_2	
Low				
10:57:00	15.1182	15.12	11.5862	11.58
10:58:00	15.1761	15.18	11.5456	11.54
10:59:00	15.1457	15.15	11.5777	11.57
11:00:00	15.0957	15.10	11.6096	11.60
11:01:00	15.186	15.19	11.5484	11.54
11:02:00	15.1399	15.15	11.5852	11.58
11:03:00	15.0822	15.09	11.6266	11.62
11:04:00	15.1131	15.12	11.6175	11.61
11:05:00	15.0603	15.07	11.6534	11.64
11:06:00	15.0334	15.04	11.6804	11.67
11:07:00	15.0136	15.02	11.6958	11.69
11:08:00	14.9432	14.95	11.7443	11.73
11:09:00	15.0176	15.02	11.683	11.67
11:10:00	15.1068	15.11	11.6327	11.62
11:11:00	15.0837	15.09	11.6317	11.62
11:12:00	15.0634	15.07	11.6694	11.66
11:13:00	15.1169	15.12	11.643	11.63
11:14:00	15.139	15.14	11.6354	11.63
11:15:00	15.1373	15.14	11.6426	11.63
11:16:00	15.062	15.07	11.7053	11.70
11:17:00	15.0738	15.08	11.695	11.69
11:18:00	15.0588	15.06	11.7025	11.69
11:19:00	15.0553	15.06	11.6991	11.69
11:20:00	15.062	15.07	11.7008	11.69
11:21:00	15.0101	15.02	11.7283	11.72
11:22:00	15.0523	15.06	11.6843	11.67
11:23:00	15.0303	15.04	11.7211	11.71
11:24:00	15.0407	15.05	11.7191	11.71
11:25:00	15.0574	15.06	11.7176	11.71
11:26:00	15.1487	15.15	11.6581	11.65
11:27:00	15.0601	15.07	11.7198	11.71
11:28:00	15.0577	15.06	11.7396	11.73
11:29:00	15.1385	15.14	11.6828	11.67
11:30:00	15.2086	15.21	11.634	11.62
11:31:00	15.2259	15.23	11.6138	11.60
11:32:00	15.135	15.14	11.6672	11.66
11:33:00	15.207	15.21	11.6083	11.60
11:34:00	15.1945	15.20	11.603	11.59
11:35:00	15.1936	15.20	11.5889	11.58
11:36:00	15.2774	15.28	11.5189	11.51
11:37:00	15.2743	15.28	11.5104	11.50
11:38:00	15.2266	15.23	11.5285	11.52
11:39:00	15.2668	15.27	11.4907	11.48
11:40:00	15.1684	15.17	11.5407	11.53
11:41:00	15.2129	15.22	11.5195	11.51
11:42:00	15.1604	15.17	11.5393	11.53
11:43:00	15.1705	15.18	11.5344	11.52
11:44:00	15.1536	15.16	11.5435	11.53
11:45:00	15.1848	15.19	11.5126	11.50
11:46:00	15.1043	15.11	11.5744	11.56
11:47:00	15.1209	15.13	11.5935	11.58
11:48:00	15.1067	15.11	11.6068	11.60
11:49:00	15.1618	15.17	11.5941	11.58
11:50:00	15.1622	15.17	11.5953	11.59
11:51:00	15.2293	15.23	11.5586	11.55
11:52:00	15.2068	15.21	11.5653	11.56
11:53:00	15.1976	15.20	11.5671	11.56
11:54:00	15.2179	15.22	11.5502	11.54
11:55:00	15.2277	15.23	11.5451	11.54
11:56:00	15.1698	15.17	11.5594	11.55
11:57:00	15.2712	15.28	11.4887	11.48
11:58:00	15.2541	15.26	11.4845	11.47
11:59:00	15.2348	15.24	11.4953	11.49
12:00:00	15.2605	15.27	11.4715	11.46
12:01:00	15.1974	15.20	11.5051	11.50
12:02:00	15.1916	15.20	11.5024	11.49
12:03:00	15.219	15.22	11.4925	11.48
12:04:00	15.2461	15.25	11.4456	11.44
12:05:00	15.3497	15.36	11.3773	11.37
12:06:00	15.3141	15.32	11.3971	11.39
12:07:00	15.2107	15.22	11.4645	11.45
12:08:00	15.2404	15.25	11.4407	11.43
12:09:00	15.2337	15.24	11.4311	11.42
12:10:00	15.3209	15.33	11.3707	11.36
12:11:00	15.307	15.31	11.3677	11.36

Test 2 **Kiln Stack**				
Date	1-Oct-18			
Analyzer	**O_2**		**CO_2**	
Low				
12:12:00	15.3092	15.31	11.353	11.34
12:13:00	15.3377	15.34	11.3422	11.33
12:14:00	15.315	15.32	11.3511	11.34
12:15:00	15.2438	15.25	11.4058	11.40
12:16:00	15.2252	15.23	11.4081	11.40

Test 3 **Kiln Stack**				
Date	2-Oct-18			
Analyzer	**O_2**		**CO_2**	
Low				
Zero Value *(Cv)*	0.0		0.0	
Direct *(C Dir)*	0		0	
Calibration Error *(ACE)*	0.00%	*PASS*	0.00%	*PASS*
System Initial *(Csi)*	0.00		0.03	
System Post *(Csf)*	0.01		0.04	
Average *(Co)*	0.01		0.04	
System Bias Initial *(SBi)*	0.0%	*PASS*	0.2%	*PASS*
System Bias Post *(SBf)*	0.0%	*PASS*	0.2%	*PASS*
Drift Assessment *(D)*	0.05%	*PASS*	0.05%	*PASS*
Mid				
Mid Value *(Cv)*	10.0		10.30	
Direct *(C Dir)*	10.0		10.3	
Calibration Error *(ACE)*	0.00%	*PASS*	0.00%	*PASS*
System Initial *(Csi)*	10.2		10.29	
System Post *(Csf)*	10.1		10.28	
Average *(Cm)*	10.2		10.29	
System Bias Initial *(SBi)*	1.0%	*PASS*	-0.1%	*PASS*
System Bias Post *(SBf)*	0.5%	*PASS*	-0.1%	*PASS*
Drift Assessment *(D)*	-0.48%	*PASS*	-0.05%	*PASS*
High				
High Value *(CS/Cv)*	21.00		20.0	
Direct *(C Dir)*	20.85		20.1	
Calibration Error *(ACE)*	-0.71%	*PASS*	0.50%	*PASS*
System Initial *(Csi)*				
System Post *(Csf)*				
Average *(Cm)*	-		-	
System Bias Initial *(SBi)*	N/A	-	N/A	-
System Bias Post *(SBf)*	N/A	-	N/A	-
Drift Assessment *(D)*	N/A	-	N/A	-
Analyser Span (Range)	25		20	
Average	15.31	15.09	12.18	12.19
Time	**Recorded**	**Corrected**	**Recorded**	**Corrected**
8:08:00	15.105	14.88	12.6533	12.67
8:09:00	15.0453	14.83	12.6825	12.70
8:10:00	15.0392	14.82	12.6842	12.70
8:11:00	15.002	14.78	12.6995	12.72
8:12:00	15.0336	14.81	12.6723	12.69
8:13:00	15.0637	14.84	12.6368	12.66
8:14:00	15.1117	14.89	12.6024	12.62
8:15:00	15.1276	14.91	12.5668	12.59
8:16:00	15.058	14.84	12.6114	12.63
8:17:00	15.0188	14.80	12.6329	12.65
8:18:00	15.0054	14.79	12.6587	12.68
8:19:00	14.9835	14.76	12.6921	12.71
8:20:00	14.9028	14.68	12.755	12.78
8:21:00	15.0079	14.79	12.6664	12.69
8:22:00	14.9025	14.68	12.7466	12.77
8:23:00	15.0153	14.80	12.6671	12.69
8:24:00	14.938	14.72	12.7172	12.74
8:25:00	14.9907	14.77	12.681	12.70
8:26:00	14.9763	14.76	12.6884	12.71
8:27:00	14.9148	14.70	12.7433	12.76
8:28:00	14.8512	14.63	12.7811	12.80
8:29:00	14.904	14.69	12.7401	12.76
8:30:00	14.8739	14.66	12.7607	12.78
8:31:00	14.891	14.67	12.7451	12.77
8:32:00	14.8718	14.65	12.7532	12.77
8:33:00	14.8165	14.60	12.7983	12.82
8:34:00	14.8675	14.65	12.7648	12.79
8:35:00	14.9533	14.73	12.7082	12.73
8:36:00	15.0851	14.86	12.6112	12.63
8:37:00	15.1412	14.92	12.5743	12.59
8:38:00	15.172	14.95	12.5518	12.57
8:39:00	15.1936	14.97	12.5369	12.56
8:40:00	15.1798	14.96	12.5463	12.57
8:41:00	15.132	14.91	12.5821	12.60
8:42:00	15.2471	15.02	12.4919	12.51
8:43:00	15.2612	15.04	12.4835	12.50
8:44:00	15.2336	15.01	12.4996	12.52
8:45:00	15.3756	15.15	12.3872	12.41
8:46:00	15.3219	15.10	12.4251	12.44
8:47:00	15.3679	15.14	12.3852	12.40
8:48:00	15.4186	15.19	12.3347	12.35
8:49:00	15.368	15.14	12.3714	12.39
8:50:00	15.4042	15.18	12.321	12.34
8:51:00	15.1084	14.89	12.1433	12.16
8:52:00	15.088	14.87	12.1361	12.15

Test 3 **Kiln Stack**				
Date	2-Oct-18			
Analyzer	**O_2**		**CO_2**	
Low				
8:53:00	15.087	14.87	12.1419	12.16
8:54:00	15.0815	14.86	12.1503	12.17
8:55:00	15.0804	14.86	12.1656	12.18
8:56:00	15.0803	14.86	12.1829	12.20
8:57:00	15.0802	14.86	12.1943	12.21
8:58:00	15.0758	14.86	12.2021	12.22
8:59:00	15.0728	14.85	12.2106	12.23
9:00:00	15.0732	14.85	12.2154	12.23
9:01:00	15.2168	14.99	12.314	12.33
9:02:00	17.8173	17.56	10.6875	10.70
9:03:00	17.5148	17.26	11.0348	11.05
9:04:00	15.3896	15.16	12.3873	12.41
9:05:00	15.3833	15.16	12.3818	12.40
9:06:00	10.1486	10.00	9.5316	9.54
9:07:00	5.8561	5.77	8.0385	8.04
9:08:00	5.8482	5.76	8.0293	8.03
9:09:00	5.8476	5.76	8.0246	8.02
9:10:00	8.15	8.03	9.2816	9.29
9:11:00	15.1317	14.91	12.5731	12.59
9:12:00	15.0389	14.82	12.6749	12.70
9:13:00	15.0308	14.81	12.6831	12.70
9:14:00	15.0854	14.86	12.6397	12.66
9:15:00	15.0936	14.87	12.6404	12.66
9:16:00	15.1661	14.94	12.5815	12.60
9:17:00	15.1489	14.93	12.5851	12.61
9:18:00	15.2406	15.02	12.5173	12.54
9:19:00	15.1802	14.96	12.5592	12.58
9:20:00	15.2081	14.99	12.5472	12.57
9:21:00	15.0689	14.85	12.6435	12.66
9:22:00	15.1043	14.88	12.6118	12.63
9:23:00	14.9847	14.77	12.7089	12.73
9:24:00	15.0702	14.85	12.6437	12.66
9:25:00	15.0844	14.86	12.6248	12.65
9:26:00	15.1322	14.91	12.5948	12.61
9:27:00	15.2796	15.06	12.4817	12.50
9:28:00	15.4368	15.21	12.3861	12.41
9:29:00	15.459	15.23	12.3811	12.40
9:30:00	15.4194	15.19	12.4035	12.42
9:31:00	15.3478	15.12	12.4687	12.49
9:32:00	15.4672	15.24	12.371	12.39
9:33:00	15.5261	15.30	12.3226	12.34
9:34:00	15.4631	15.24	12.3654	12.38
9:35:00	15.627	15.40	12.2225	12.24
9:36:00	15.5755	15.35	12.2614	12.28
9:37:00	15.6686	15.44	12.2012	12.22
9:38:00	15.7471	15.52	12.1297	12.15
9:39:00	15.8374	15.61	12.0629	12.08
9:40:00	15.8149	15.58	12.0294	12.05
9:41:00	16.0789	15.84	11.8097	11.83
9:42:00	16.3298	16.09	11.6594	11.68
9:43:00	16.4269	16.19	11.6005	11.62
9:44:00	16.4193	16.18	11.6109	11.63
9:45:00	16.4147	16.18	11.6181	11.63
9:46:00	16.3673	16.13	11.6461	11.66
9:47:00	16.3951	16.16	11.6334	11.65
9:48:00	16.3936	16.15	11.6339	11.65
9:49:00	16.4172	16.18	11.6157	11.63
9:50:00	16.3226	16.08	11.6846	11.70
9:51:00	16.3676	16.13	11.6517	11.67
9:52:00	16.3533	16.11	11.6625	11.68
9:53:00	16.3813	16.14	11.6315	11.65
9:54:00	16.3881	16.15	11.6267	11.64
9:55:00	16.2876	16.05	11.6921	11.71
9:56:00	16.3327	16.09	11.6647	11.68
9:57:00	16.2775	16.04	11.7021	11.72
9:58:00	16.2688	16.03	11.7101	11.73
9:59:00	16.3253	16.09	11.664	11.68
10:00:00	16.3481	16.11	11.6551	11.67
10:01:00	16.3304	16.09	11.666	11.68
10:02:00	16.3053	16.07	11.6823	11.70
10:03:00	16.279	16.04	11.704	11.72
10:04:00	16.2725	16.03	11.7074	11.72
10:05:00	16.311	16.07	11.6808	11.70
10:06:00	16.2764	16.04	11.705	11.72
10:07:00	16.2387	16.00	11.7284	11.74

Test 3 **Kiln Stack**				
Date	2-Oct-18			
Analyzer	**O_2**		**CO_2**	
Low				
10:08:00	16.1372	15.90	11.7996	11.82
10:09:00	16.2195	15.98	11.7391	11.76
10:10:00	16.1659	15.93	11.7878	11.80
10:11:00	15.9013	15.67	11.9661	11.98
10:12:00	16.0867	15.85	11.8403	11.86
10:13:00	15.9374	15.70	11.9579	11.98
10:14:00	15.896	15.66	11.9849	12.00
10:15:00	15.5132	15.29	12.2603	12.28
10:16:00	15.8671	15.64	12.0054	12.02
10:17:00	15.7959	15.57	12.0289	12.05
10:18:00	15.804	15.57	12.0209	12.04
10:19:00	15.2113	14.99	12.4382	12.46
10:20:00	15.4316	15.21	12.2556	12.27
10:21:00	15.5991	15.37	12.1417	12.16
10:22:00	15.7686	15.54	12.0182	12.04
10:23:00	15.8551	15.62	11.9583	11.98
10:24:00	15.6544	15.43	12.0983	12.12
10:25:00	15.3413	15.12	12.3281	12.35
10:26:00	15.4676	15.24	12.2366	12.26
10:27:00	15.6748	15.45	12.0922	12.11
10:28:00	15.4872	15.26	12.2522	12.27
10:29:00	15.5981	15.37	12.1771	12.20
10:30:00	15.4486	15.22	12.3035	12.32
10:31:00	15.5844	15.36	12.2128	12.23
10:32:00	15.616	15.39	12.1845	12.20
10:33:00	15.6369	15.41	12.1687	12.19
10:34:00	15.4453	15.22	12.3231	12.34
10:35:00	15.477	15.25	12.3104	12.33
10:36:00	15.4475	15.22	12.3316	12.35
10:37:00	15.4432	15.22	12.3482	12.37
10:38:00	15.5643	15.34	12.266	12.28
10:39:00	15.6014	15.37	12.2352	12.25
10:40:00	15.5595	15.33	12.2584	12.28
10:41:00	15.6333	15.40	12.2147	12.23
10:42:00	15.5308	15.30	12.2744	12.29
10:43:00	15.6654	15.44	12.1724	12.19
10:44:00	15.6456	15.42	12.1784	12.20
10:45:00	15.697	15.47	12.1526	12.17
10:46:00	15.6154	15.39	12.2049	12.22
10:47:00	15.5276	15.30	12.2616	12.28
10:48:00	15.4893	15.26	12.2718	12.29
10:49:00	15.6508	15.42	12.1478	12.17
10:50:00	15.5867	15.36	12.1836	12.20
10:51:00	15.5502	15.32	12.2077	12.23
10:52:00	15.4189	15.19	12.3068	12.33
10:53:00	15.3632	15.14	12.3316	12.35
10:54:00	15.443	15.22	12.2826	12.30
10:55:00	15.384	15.16	12.3246	12.34
10:56:00	15.4302	15.20	12.2907	12.31
10:57:00	15.4673	15.24	12.2675	12.29
10:58:00	15.3792	15.15	12.3269	12.35
10:59:00	15.6035	15.38	12.1462	12.16
11:00:00	15.4591	15.23	12.2585	12.28
11:01:00	15.4336	15.21	12.2637	12.28
11:02:00	15.4161	15.19	12.2705	12.29
11:03:00	15.376	15.15	12.3065	12.33
11:04:00	15.3853	15.16	12.2991	12.32
11:05:00	15.2342	15.01	12.401	12.42
11:06:00	15.1639	14.94	12.4636	12.48
11:07:00	15.1228	14.90	12.4798	12.50
11:08:00	15.1622	14.94	12.468	12.49
11:09:00	15.0882	14.87	12.5155	12.54
11:10:00	15.2198	15.00	12.4061	12.43
11:11:00	15.3551	15.13	12.3176	12.34
11:12:00	15.379	15.15	12.2986	12.32
11:13:00	15.2708	15.05	12.3776	12.40
11:14:00	15.4321	15.21	12.251	12.27
11:15:00	15.6297	15.40	12.1013	12.12
11:16:00	15.5537	15.33	12.1555	12.17
11:17:00	15.53	15.30	12.1734	12.19
11:18:00	15.3805	15.16	12.2729	12.29
11:19:00	15.5075	15.28	12.1887	12.21
11:20:00	15.6918	15.46	12.0409	12.06
11:21:00	15.6244	15.40	12.0872	12.11
11:22:00	15.4343	15.21	12.2416	12.26

Test 3 Kiln Stack				
Date	2-Oct-18			
Analyzer	O_2		CO_2	
Low				
11:23:00	15.2303	15.01	12.3603	12.38
11:24:00	15.4756	15.25	12.2008	12.22
11:25:00	15.6049	15.38	12.1094	12.13
11:26:00	15.4086	15.18	12.237	12.26
11:27:00	15.4848	15.26	12.1779	12.20
11:28:00	15.6108	15.38	12.0944	12.11
11:29:00	15.5446	15.32	12.1531	12.17
11:30:00	15.4764	15.25	12.1724	12.19
11:31:00	15.5572	15.33	12.1199	12.14
11:32:00	15.7048	15.48	12.0165	12.03
11:33:00	15.6852	15.46	12.0225	12.04
11:34:00	15.5182	15.29	12.1467	12.16
11:35:00	15.3756	15.15	12.252	12.27
11:36:00	15.4378	15.21	12.2098	12.23
11:37:00	15.6754	15.45	12.0245	12.04
11:38:00	15.6355	15.41	12.0688	12.09
11:39:00	15.2956	15.07	12.3277	12.35
11:40:00	15.4105	15.19	12.2405	12.26
11:41:00	15.4574	15.23	12.1984	12.22
11:42:00	15.6231	15.39	12.0878	12.11
11:43:00	15.6376	15.41	12.0755	12.09
11:44:00	15.7695	15.54	11.9699	11.99
11:45:00	15.5902	15.36	12.0824	12.10
11:46:00	15.6083	15.38	12.0674	12.09
11:47:00	15.7344	15.50	11.9695	11.99
11:48:00	15.6737	15.44	12.0142	12.03
11:49:00	15.583	15.36	12.0952	12.11
11:50:00	15.3057	15.08	12.2967	12.32
11:51:00	15.3385	15.11	12.2576	12.28
11:52:00	15.2729	15.05	12.3088	12.33
11:53:00	15.3547	15.13	12.2535	12.27
11:54:00	15.2111	14.99	12.3369	12.36
11:55:00	15.1127	14.89	12.4137	12.43
11:56:00	15.1834	14.96	12.3526	12.37
11:57:00	15.0087	14.79	12.499	12.52
11:58:00	15.0874	14.87	12.4225	12.44
11:59:00	14.9847	14.77	12.5167	12.54
12:00:00	14.8327	14.62	12.6026	12.62
12:01:00	14.8849	14.67	12.5958	12.62
12:02:00	14.9292	14.71	12.5374	12.56
12:03:00	14.9026	14.68	12.5597	12.58
12:04:00	15.1444	14.92	12.3909	12.41
12:05:00	15.1062	14.89	12.3979	12.42
12:06:00	15.3453	15.12	12.2309	12.25
12:07:00	15.1479	14.93	12.3615	12.38
12:08:00	15.1669	14.95	12.3521	12.37
12:09:00	15.1808	14.96	12.3421	12.36
12:10:00	15.2602	15.04	12.2865	12.31
12:11:00	15.3245	15.10	12.2331	12.25
12:12:00	15.4029	15.18	12.2004	12.22
12:13:00	15.3915	15.17	12.2022	12.22
12:14:00	15.3619	15.14	12.2131	12.23
12:15:00	15.5082	15.28	12.1018	12.12
12:16:00	15.3507	15.13	12.2316	12.25
12:17:00	15.3105	15.09	12.2555	12.27
12:18:00	15.4364	15.21	12.15	12.17
12:19:00	15.3375	15.11	12.2403	12.26
12:20:00	15.5124	15.29	12.0892	12.11
12:21:00	15.4834	15.26	12.1254	12.14
12:22:00	15.4533	15.23	12.1467	12.16
12:23:00	15.4255	15.20	12.1583	12.18
12:24:00	15.2523	15.03	12.2783	12.30
12:25:00	15.3693	15.14	12.1942	12.21
12:26:00	15.2032	14.98	12.3085	12.33
12:27:00	15.3556	15.13	12.2055	12.22
12:28:00	15.3721	15.15	12.1938	12.21
12:29:00	15.377	15.15	12.2127	12.23

Summary of CEM Data

Kiln Stack, Alt Fuels

O_2 (%)	CO (ppm)	CO_2 (%)
15.3	244.7	10.7

Test ID: Date: 10/10&11/2018

Time	O_2 (%)	CO (ppm)	CO_2 (%)
11:53 to 14:40 and 16:48 to 18:20	15.6	278.2	11.4

Test ID: Date: 12-Oct-18

Time	O_2 (%)	CO (ppm)	CO_2 (%)
8:48 to 13:13	15.4	222.3	10.3

Test ID: Date: 12-Oct-18

Time	O_2 (%)	CO (ppm)	CO_2 (%)
13:57 to 18:18	15.0	233.7	10.6

Test 1 **Kiln Stack**						
Date	10-Oct-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
Zero Value *(Cv)*	0.0		0.0		0.0	
Direct *(C Dir)*	0		0		0	
Calibration Error *(ACE)*	0.00%	*PASS*	0.00%	*PASS*	0.00%	*PASS*
System Initial *(Csi)*	0.00		0.00		1.0	
System Post *(Csf)*	0.01		0.01		1.3	
Average *(Co)*	0.01		0.01		1.15	
System Bias Initial *(SBi)*	0.0%	*PASS*	0.0%	*PASS*	0.2%	*PASS*
System Bias Post *(SBf)*	0.0%	*PASS*	0.1%	*PASS*	0.3%	*PASS*
Drift Assessment *(D)*	0.05%	*PASS*	0.05%	*PASS*	0.06%	*PASS*
Mid						
Mid Value *(Cv)*	10.0		10.30		152.0	
Direct *(C Dir)*	10.0		10.3		152	
Calibration Error *(ACE)*	0.00%	*PASS*	0.00%	*PASS*	0.00%	*PASS*
System Initial *(Csi)*	9.95		10.3		153.3	
System Post *(Csf)*	9.9		10.1		154	
Average *(Cm)*	9.9		10.3		153.7	
System Bias Initial *(SBi)*	-0.2%	*PASS*	0.0%	*PASS*	0.3%	*PASS*
System Bias Post *(SBf)*	-0.5%	*PASS*	-1.0%	*PASS*	0.4%	*PASS*
Drift Assessment *(D)*	-0.24%	*PASS*	-1.00%	*PASS*	0.14%	*PASS*
High						
High Value *(CS/Cv)*	21.00		20.0		500.0	
Direct *(C Dir)*	20.85		20.1		498.0	
Calibration Error *(ACE)*	-0.71%	*PASS*	0.50%	*PASS*	-0.40%	*PASS*
System Initial *(Csi)*						
System Post *(Csf)*						
Average *(Cm)*	-		-		-	
System Bias Initial *(SBi)*	N/A	-	N/A	-	N/A	-
System Bias Post *(SBf)*	N/A	-	N/A	-	N/A	-
Drift Assessment *(D)*	N/A	-	N/A	-	N/A	-
Analyser Span (Range)	25		20		100	
Average	15.49	15.61	11.38	11.38	280.24	278.17
Time	**Recorded**	**Corrected**	**Recorded**	**Corrected**	**Recorded**	**Corrected**
11:53:00	15.6	15.7	11.4	11.4	272.6	270.6
11:54:00	15.6	15.7	11.4	11.4	268.5	266.5
11:55:00	15.6	15.7	11.4	11.4	252.2	250.2
11:56:00	15.6	15.7	11.4	11.4	255.7	253.7
11:57:00	15.5	15.6	11.5	11.5	257.1	255.1
11:58:00	15.5	15.6	11.5	11.5	274.1	272.1
11:59:00	15.5	15.6	11.5	11.5	276.5	274.5
12:00:00	15.5	15.6	11.5	11.5	261.2	259.2
12:01:00	15.5	15.6	11.5	11.5	263.8	261.8
12:02:00	15.4	15.5	11.6	11.6	249.2	247.2
12:03:00	15.3	15.5	11.6	11.6	243.7	241.7
12:04:00	15.4	15.6	11.6	11.6	260.3	258.3
12:05:00	15.3	15.5	11.7	11.7	271.1	269.0
12:06:00	15.4	15.5	11.6	11.6	273.3	271.3
12:07:00	15.3	15.4	11.7	11.7	261.9	259.9
12:08:00	15.4	15.5	11.7	11.7	256.6	254.6
12:09:00	15.4	15.5	11.7	11.7	259.9	257.9
12:10:00	15.4	15.5	11.7	11.7	257.6	255.6
12:11:00	15.3	15.4	11.7	11.7	258.7	256.7
12:12:00	15.3	15.4	11.7	11.7	275.7	273.6

Test 1 **Kiln Stack**						
Date	10-Oct-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
12:13:00	15.3	15.4	11.7	11.7	278.6	276.6
12:14:00	15.4	15.5	11.6	11.6	281.7	279.6
12:15:00	15.3	15.5	11.6	11.6	260.3	258.3
12:16:00	15.4	15.5	11.6	11.6	268.6	266.6
12:17:00	15.3	15.4	11.7	11.7	279.7	277.6
12:18:00	15.4	15.5	11.6	11.6	265.2	263.2
12:19:00	15.4	15.5	11.6	11.6	274.1	272.1
12:20:00	15.4	15.5	11.6	11.6	268.0	266.0
12:21:00	15.3	15.4	11.7	11.7	258.3	256.3
12:22:00	15.3	15.4	11.7	11.7	268.6	266.6
12:23:00	15.3	15.4	11.7	11.7	275.5	273.4
12:24:00	15.2	15.4	11.7	11.7	280.6	278.5
12:25:00	15.3	15.5	11.6	11.6	290.8	288.7
12:26:00	15.3	15.4	11.7	11.7	286.2	284.1
12:27:00	15.4	15.5	11.6	11.6	267.1	265.0
12:28:00	15.4	15.6	11.5	11.5	282.0	280.0
12:29:00	15.4	15.5	11.6	11.6	268.3	266.3
12:30:00	15.4	15.5	11.6	11.6	273.4	271.3
12:31:00	15.3	15.4	11.6	11.6	285.5	283.4
12:32:00	15.4	15.5	11.6	11.6	274.1	272.1
12:33:00	15.4	15.5	11.6	11.6	265.0	263.0
12:34:00	15.4	15.6	11.5	11.5	270.9	268.8
12:35:00	15.6	15.7	11.6	11.6	258.9	256.9
12:36:00	15.6	15.8	11.5	11.5	267.3	265.3
12:37:00	15.7	15.8	11.5	11.5	274.0	272.0
12:38:00	15.7	15.8	11.4	11.4	271.1	269.0
12:39:00	15.7	15.8	11.4	11.4	264.2	262.1
12:40:00	15.6	15.7	11.5	11.5	255.7	253.7
12:41:00	15.6	15.7	11.5	11.5	276.3	274.3
12:42:00	15.6	15.7	11.5	11.5	272.1	270.1
12:43:00	15.6	15.7	11.5	11.5	267.7	265.7
12:44:00	15.5	15.6	11.6	11.6	274.1	272.1
12:45:00	15.5	15.6	11.6	11.6	265.7	263.7
12:46:00	15.5	15.6	11.6	11.6	259.6	257.6
12:47:00	15.5	15.7	11.5	11.5	269.0	267.0
12:48:00	15.5	15.6	11.5	11.5	286.7	284.6
12:49:00	15.6	15.7	11.5	11.5	272.8	270.8
12:50:00	15.5	15.6	11.5	11.5	266.2	264.2
12:51:00	15.5	15.7	11.5	11.5	258.9	256.9
12:52:00	15.5	15.7	11.5	11.5	279.7	277.7
12:53:00	15.6	15.7	11.5	11.5	277.9	275.8
12:54:00	15.5	15.6	11.5	11.5	281.4	279.3
12:55:00	15.5	15.6	11.5	11.5	266.4	264.4
12:56:00	15.5	15.6	11.5	11.5	255.3	253.4
12:57:00	15.5	15.6	11.5	11.5	257.3	255.3
12:58:00	15.5	15.6	11.6	11.6	273.0	270.9
12:59:00	15.5	15.6	11.6	11.6	287.5	285.4
13:00:00	15.5	15.6	11.6	11.6	281.6	279.5
13:01:00	15.4	15.6	11.7	11.7	276.7	274.6
13:02:00	15.3	15.4	11.8	11.8	266.5	264.4

Test 1 **Kiln Stack**						
Date	10-Oct-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
13:03:00	15.4	15.6	11.7	11.7	272.1	270.1
13:04:00	15.5	15.6	11.7	11.7	264.9	262.9
13:05:00	15.6	15.7	11.6	11.6	280.2	278.1
13:06:00	15.6	15.7	11.6	11.6	286.0	283.9
13:07:00	15.6	15.7	11.6	11.6	286.3	284.2
13:08:00	15.5	15.6	11.6	11.6	273.9	271.9
13:09:00	15.5	15.6	11.6	11.6	263.9	261.9
13:10:00	15.6	15.7	11.6	11.6	265.7	263.7
13:11:00	15.5	15.6	11.6	11.6	267.8	265.8
13:12:00	15.5	15.6	11.6	11.6	272.0	270.0
13:13:00	15.6	15.7	11.6	11.6	277.6	275.5
13:14:00	15.5	15.7	11.6	11.6	283.2	281.1
13:15:00	15.5	15.7	11.6	11.6	257.0	255.0
13:16:00	15.5	15.6	11.6	11.6	254.3	252.3
13:17:00	15.4	15.6	11.6	11.6	274.8	272.8
13:18:00	15.5	15.6	11.6	11.6	270.4	268.3
13:19:00	15.5	15.6	11.6	11.6	267.7	265.7
13:20:00	15.5	15.6	11.6	11.6	262.0	260.0
13:21:00	15.4	15.5	11.6	11.6	267.5	265.5
13:22:00	15.4	15.5	11.6	11.6	265.2	263.1
13:23:00	15.5	15.6	11.6	11.6	276.3	274.3
13:24:00	15.5	15.6	11.6	11.6	262.7	260.7
13:25:00	15.5	15.6	11.5	11.5	291.0	288.9
13:26:00	15.5	15.6	11.5	11.5	267.4	265.4
13:27:00	15.4	15.5	11.6	11.6	248.2	246.2
13:28:00	15.4	15.6	11.6	11.6	254.3	252.3
13:29:00	15.4	15.5	11.6	11.6	262.3	260.3
13:30:00	15.5	15.6	11.5	11.5	292.2	290.1
13:31:00	15.5	15.6	11.5	11.5	281.1	279.0
13:32:00	15.5	15.6	11.5	11.5	280.0	278.0
13:33:00	15.5	15.6	11.5	11.5	256.6	254.6
13:34:00	15.5	15.6	11.4	11.4	250.5	248.5
13:35:00	15.5	15.6	11.5	11.5	263.2	261.2
13:36:00	15.5	15.6	11.4	11.4	275.3	273.2
13:37:00	15.5	15.6	11.4	11.4	273.0	271.0
13:38:00	15.6	15.7	11.4	11.4	272.9	270.9
13:39:00	15.6	15.7	11.3	11.3	264.9	262.9
13:40:00	15.6	15.7	11.4	11.4	268.0	266.0
13:41:00	15.6	15.7	11.3	11.3	271.4	269.4
13:42:00	15.6	15.8	11.3	11.3	293.9	291.8
13:43:00	15.7	15.8	11.3	11.3	276.0	273.9
13:44:00	15.7	15.8	11.2	11.2	306.1	303.9
13:45:00	15.6	15.8	11.3	11.3	314.9	312.7
13:46:00	15.6	15.7	11.3	11.3	272.5	270.5
13:47:00	15.6	15.7	11.3	11.3	267.2	265.2
13:48:00	15.5	15.6	11.3	11.3	278.6	276.6
13:49:00	15.5	15.6	11.3	11.3	275.7	273.7
13:50:00	15.3	15.4	11.2	11.2	280.9	278.8
13:51:00	15.4	15.5	11.2	11.2	275.6	273.6
13:52:00	15.4	15.6	11.1	11.1	269.5	267.5

Test 1 **Kiln Stack**						
Date	10-Oct-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
13:53:00	15.4	15.5	11.1	11.1	270.4	268.3
13:54:00	15.4	15.5	11.2	11.2	279.2	277.1
13:55:00	15.4	15.5	11.2	11.2	275.6	273.6
13:56:00	15.3	15.4	11.2	11.2	290.8	288.7
13:57:00	15.3	15.5	11.2	11.2	279.5	277.4
13:58:00	15.4	15.5	11.2	11.2	250.5	248.6
13:59:00	15.5	15.6	11.1	11.1	253.9	251.9
14:00:00	15.4	15.5	11.2	11.2	256.1	254.1
14:01:00	15.4	15.5	11.2	11.2	283.6	281.5
14:02:00	15.3	15.5	11.2	11.2	282.0	279.9
14:03:00	15.4	15.5	11.2	11.2	273.2	271.2
14:04:00	15.3	15.4	11.3	11.3	263.1	261.0
14:05:00	15.3	15.4	11.2	11.2	244.3	242.4
14:06:00	15.3	15.4	11.3	11.3	261.2	259.2
14:07:00	15.3	15.4	11.3	11.3	263.2	261.2
14:08:00	15.2	15.4	11.4	11.4	264.8	262.8
14:09:00	15.2	15.3	11.4	11.4	275.4	273.4
14:10:00	15.2	15.3	11.4	11.4	268.8	266.8
14:11:00	15.2	15.3	11.5	11.5	257.4	255.4
14:12:00	15.2	15.3	11.5	11.5	247.4	245.5
14:13:00	15.3	15.4	11.4	11.4	281.9	279.8
14:14:00	15.2	15.4	11.5	11.5	267.3	265.3
14:15:00	15.2	15.3	11.5	11.5	266.4	264.4
14:16:00	15.2	15.4	11.5	11.5	274.5	272.4
14:17:00	15.3	15.4	11.5	11.5	285.1	283.0
14:18:00	15.3	15.4	11.4	11.4	255.9	253.9
14:19:00	15.4	15.5	11.4	11.4	252.3	250.4
14:20:00	15.3	15.4	11.5	11.5	256.9	254.9
14:21:00	15.3	15.5	11.4	11.4	278.6	276.6
14:22:00	15.3	15.4	11.4	11.4	253.2	251.3
14:23:00	15.4	15.5	11.4	11.4	247.7	245.7
14:24:00	15.3	15.5	11.4	11.4	263.1	261.1
14:25:00	15.2	15.4	11.5	11.5	266.5	264.4
14:26:00	15.3	15.4	11.5	11.5	274.9	272.8
14:27:00	15.3	15.4	11.4	11.4	282.4	280.4
14:28:00	15.3	15.4	11.4	11.4	270.8	268.7
14:29:00	15.3	15.4	11.4	11.4	257.8	255.8
14:30:00	15.2	15.3	11.5	11.5	249.0	247.0
14:31:00	15.2	15.3	11.4	11.4	251.0	249.0
14:32:00	15.2	15.4	11.4	11.4	263.1	261.1
14:33:00	15.2	15.4	11.4	11.4	269.2	267.2
14:34:00	15.2	15.3	11.4	11.4	283.9	281.8
14:35:00	15.2	15.3	11.4	11.4	263.3	261.3
14:36:00	15.3	15.4	11.4	11.4	262.8	260.8
14:37:00	15.4	15.5	11.3	11.3	272.6	270.6
14:38:00	15.4	15.5	11.3	11.3	275.6	273.6
14:39:00	15.5	15.6	11.2	11.2	255.4	253.5
14:40:00	15.4	15.5	11.3	11.3	266.5	264.5
16:48:00	15.4	15.6	11.3	11.3	265.1	263.1
16:49:00	15.4	15.6	11.3	11.3	256.5	254.5

Test 1 **Kiln Stack**						
Date	10-Oct-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
16:50:00	15.4	15.6	11.3	11.3	263.4	261.4
16:51:00	15.5	15.6	11.2	11.2	266.7	264.7
16:52:00	15.5	15.6	11.2	11.2	283.2	281.1
16:53:00	15.5	15.6	11.2	11.2	263.8	261.8
16:54:00	15.5	15.6	11.2	11.2	259.8	257.8
16:55:00	15.5	15.7	11.2	11.2	247.6	245.6
16:56:00	15.5	15.6	11.2	11.2	259.6	257.6
16:57:00	15.6	15.7	11.1	11.1	273.7	271.6
16:58:00	15.5	15.6	11.2	11.2	273.3	271.3
16:59:00	15.4	15.6	11.3	11.3	264.9	262.9
17:00:00	15.5	15.6	11.2	11.2	262.9	260.9
17:01:00	15.5	15.6	11.2	11.2	248.9	247.0
17:02:00	15.6	15.7	11.1	11.1	247.5	245.5
17:03:00	15.6	15.7	11.1	11.1	242.3	240.4
17:04:00	15.5	15.6	11.2	11.2	261.1	259.1
17:05:00	15.6	15.7	11.1	11.1	263.4	261.4
17:06:00	15.6	15.7	11.1	11.1	246.7	244.8
17:07:00	15.6	15.7	11.1	11.1	246.7	244.7
17:08:00	15.6	15.8	11.1	11.1	246.8	244.9
17:09:00	15.6	15.8	11.1	11.1	246.7	244.8
17:10:00	15.6	15.7	11.1	11.1	246.2	244.2
17:11:00	15.6	15.7	11.1	11.1	246.0	244.0
17:12:00	15.6	15.7	11.1	11.1	246.8	244.8
17:13:00	15.6	15.8	11.1	11.1	246.7	244.7
17:14:00	15.6	15.7	11.1	11.1	246.7	244.8
17:15:00	15.7	15.8	11.0	11.0	246.7	244.7
17:16:00	15.7	15.9	11.0	11.0	246.7	244.8
17:17:00	15.7	15.8	11.0	11.0	246.7	244.7
17:18:00	15.7	15.8	11.0	11.0	246.1	244.1
17:19:00	15.6	15.7	11.1	11.1	246.7	244.8
17:20:00	15.6	15.7	11.1	11.1	246.3	244.3
17:21:00	15.6	15.8	11.1	11.1	246.8	244.8
17:22:00	15.6	15.7	11.1	11.1	246.7	244.8
17:23:00	15.6	15.7	11.1	11.1	246.7	244.8
17:24:00	15.6	15.8	11.1	11.1	246.7	244.8
17:25:00	15.6	15.7	11.1	11.1	246.7	244.8
17:26:00	15.6	15.8	11.1	11.1	246.9	245.0
17:27:00	15.6	15.7	11.2	11.2	246.1	244.1
17:28:00	15.5	15.7	11.2	11.2	260.0	258.0
17:29:00	15.5	15.6	11.2	11.2	259.9	257.9
17:30:00	15.6	15.7	11.4	11.4	270.4	268.3
17:31:00	15.7	15.8	11.3	11.3	280.8	278.7
17:32:00	15.6	15.7	11.4	11.4	291.2	289.1
17:33:00	15.5	15.6	11.5	11.5	301.7	299.5
17:34:00	15.6	15.7	11.4	11.4	312.1	310.0
17:35:00	15.6	15.8	11.4	11.4	322.6	320.4
17:36:00	15.7	15.8	11.3	11.3	323.6	321.4
17:37:00	15.6	15.8	11.3	11.3	324.6	322.4
17:38:00	15.7	15.8	11.3	11.3	325.6	323.4
17:39:00	15.7	15.8	11.3	11.3	326.6	324.4

Test 1 **Kiln Stack**						
Date	10-Oct-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
17:40:00	15.7	15.8	11.3	11.3	327.6	325.3
17:41:00	15.6	15.8	11.3	11.3	328.6	326.3
17:42:00	15.7	15.8	11.3	11.3	329.6	327.3
17:43:00	15.6	15.8	11.3	11.3	330.6	328.3
17:44:00	15.6	15.8	11.3	11.3	331.6	329.3
17:45:00	15.6	15.8	11.3	11.3	332.6	330.3
17:46:00	15.6	15.7	11.3	11.3	333.6	331.3
17:47:00	15.6	15.8	11.3	11.3	334.6	332.3
17:48:00	15.7	15.8	11.3	11.3	335.6	333.3
17:49:00	15.7	15.8	11.2	11.2	336.6	334.3
17:50:00	15.7	15.8	11.2	11.2	337.6	335.3
17:51:00	15.7	15.8	11.2	11.2	338.6	336.3
17:52:00	15.7	15.8	11.2	11.2	339.6	337.3
17:53:00	15.7	15.9	11.1	11.1	340.6	338.3
17:54:00	15.8	15.9	11.1	11.1	341.6	339.3
17:55:00	15.7	15.8	11.1	11.1	342.6	340.3
17:56:00	15.7	15.8	11.2	11.2	343.6	341.3
17:57:00	15.7	15.8	11.2	11.2	344.6	342.3
17:58:00	15.6	15.8	11.2	11.2	345.6	343.3
17:59:00	15.6	15.8	11.2	11.2	346.6	344.3
18:00:00	15.6	15.7	11.2	11.2	347.6	345.3
18:01:00	15.6	15.7	11.2	11.2	348.6	346.3
18:02:00	15.6	15.7	11.2	11.2	349.6	347.3
18:03:00	15.6	15.7	11.3	11.3	350.6	348.3
18:04:00	15.6	15.7	11.2	11.2	351.6	349.3
18:05:00	15.6	15.8	11.2	11.2	352.6	350.3
18:06:00	15.6	15.7	11.2	11.2	353.6	351.3
18:07:00	15.7	15.8	11.2	11.2	354.6	352.3
18:08:00	15.6	15.7	11.2	11.2	355.6	353.3
18:09:00	15.7	15.8	11.2	11.2	356.6	354.3
18:10:00	15.6	15.7	11.2	11.2	357.6	355.3
18:11:00	15.6	15.7	11.2	11.2	358.6	356.2
18:12:00	15.6	15.7	11.2	11.2	359.6	357.2
18:13:00	15.6	15.7	11.3	11.3	360.6	358.2
18:14:00	15.6	15.7	11.2	11.2	361.6	359.2
18:15:00	15.7	15.8	11.2	11.2	362.6	360.2
18:16:00	15.6	15.7	11.2	11.2	363.6	361.2
18:17:00	15.7	15.9	11.1	11.1	364.6	362.2
18:18:00	15.6	15.8	11.2	11.2	365.6	363.2
18:19:00	15.6	15.8	11.2	11.2	359.1	356.8

Test 2 **Kiln Stack**						
Date	12-Oct-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
Zero Value *(Cv)*	0.0		0.0		0.0	
Direct *(C Dir)*	0		0		0	
Calibration Error *(ACE)*	0.00%	*PASS*	0.00%	*PASS*	0.00%	*PASS*
System Initial *(Csi)*	0.01		0.00		1.1	
System Post *(Csf)*	0.01		0.02		2.3	
Average *(Co)*	0.01		0.01		1.70	
System Bias Initial *(SBi)*	0.0%	*PASS*	0.0%	*PASS*	0.2%	*PASS*
System Bias Post *(SBf)*	0.0%	*PASS*	0.1%	*PASS*	0.5%	*PASS*
Drift Assessment *(D)*	0.00%	*PASS*	0.10%	*PASS*	0.24%	*PASS*
Mid						
Mid Value *(Cv)*	10.0		10.30		152.0	
Direct *(C Dir)*	10.0		10.3		151.6	
Calibration Error *(ACE)*	0.00%	*PASS*	0.00%	*PASS*	-0.08%	*PASS*
System Initial *(Csi)*	9.9		10.31		151	
System Post *(Csf)*	10.1		10.33		153	
Average *(Cm)*	10.0		10.31		152.0	
System Bias Initial *(SBi)*	-0.5%	*PASS*	0.0%	*PASS*	-0.1%	*PASS*
System Bias Post *(SBf)*	0.5%	*PASS*	0.1%	*PASS*	0.3%	*PASS*
Drift Assessment *(D)*	0.95%	*PASS*	0.10%	*PASS*	0.40%	*PASS*
High						
High Value *(CS/Cv)*	21.00		20.0		500.0	
Direct *(C Dir)*	20.85		20.1		498.0	
Calibration Error *(ACE)*	-0.71%	*PASS*	0.50%	*PASS*	-0.40%	*PASS*
System Initial *(Csi)*						
System Post *(Csf)*						
Average *(Cm)*	-		-		-	
System Bias Initial *(SBi)*	N/A	-	N/A	-	N/A	-
System Bias Post *(SBf)*	N/A	-	N/A	-	N/A	-
Drift Assessment *(D)*	N/A	-	N/A	-	N/A	-
Analyser Span (Range)	25		20		100	
Average	15.37	15.38	10.29	10.28	221.53	222.32
Time	**Recorded**	**Corrected**	**Recorded**	**Corrected**	**Recorded**	**Corrected**
8:48:00	14.8	14.8	11.3	11.3	228.5	229.3
8:49:00	14.9	14.9	11.2	11.2	227.1	228.0
8:50:00	14.9	14.9	11.2	11.2	227.7	228.5
8:51:00	14.8	14.8	11.4	11.4	227.2	228.0
8:52:00	14.8	14.8	11.2	11.2	228.2	229.0
8:53:00	14.9	14.9	11.1	11.1	230.1	231.0
8:54:00	14.8	14.8	11.2	11.2	226.9	227.8
8:55:00	14.8	14.8	11.2	11.2	228.4	229.3
8:56:00	15.0	15.0	11.0	10.9	229.2	230.1
8:57:00	15.0	15.0	10.9	10.9	225.0	225.8
8:58:00	15.1	15.1	10.8	10.8	227.5	228.4
8:59:00	15.3	15.3	10.2	10.2	225.9	226.7
9:00:00	14.9	14.9	11.0	11.0	225.7	226.5
9:01:00	14.8	14.8	11.2	11.2	226.9	227.7
9:02:00	14.9	14.9	11.1	11.1	226.6	227.5
9:03:00	14.8	14.8	11.3	11.3	225.1	226.0
9:04:00	15.0	15.0	10.8	10.8	225.6	226.4
9:05:00	14.9	15.0	10.8	10.8	225.4	226.2
9:06:00	14.9	14.9	10.9	10.9	226.2	227.0
9:07:00	15.0	15.0	10.8	10.8	228.7	229.6

Test 2 **Kiln Stack**						
Date	12-Oct-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
9:08:00	14.7	14.7	11.4	11.4	232.5	233.5
9:09:00	15.1	15.1	10.8	10.8	229.5	230.4
9:10:00	14.8	14.8	11.2	11.2	228.8	229.7
9:11:00	14.9	14.9	10.8	10.8	230.6	231.5
9:12:00	15.1	15.1	10.4	10.4	229.5	230.4
9:13:00	14.9	14.9	10.9	10.9	228.6	229.5
9:14:00	14.8	14.8	11.2	11.2	231.9	232.8
9:15:00	14.9	14.9	11.1	11.1	230.6	231.5
9:16:00	14.8	14.8	11.3	11.3	230.6	231.4
9:17:00	14.8	14.8	11.3	11.3	229.1	229.9
9:18:00	14.8	14.8	11.1	11.1	231.2	232.1
9:19:00	14.8	14.8	11.2	11.2	229.9	230.8
9:20:00	15.0	15.0	10.8	10.8	227.4	228.2
9:21:00	14.8	14.8	11.2	11.2	227.5	228.4
9:22:00	15.0	15.0	10.8	10.8	227.5	228.3
9:23:00	14.9	14.9	11.0	11.0	227.9	228.7
9:24:00	14.9	14.9	11.1	11.1	229.2	230.1
9:25:00	14.8	14.8	11.3	11.3	228.0	228.8
9:26:00	15.1	15.1	10.8	10.7	228.7	229.6
9:27:00	15.0	15.0	11.0	11.0	228.9	229.8
9:28:00	14.8	14.8	11.4	11.4	229.6	230.5
9:29:00	14.9	14.9	11.1	11.1	229.1	230.0
9:30:00	14.9	14.9	11.2	11.2	227.8	228.7
9:31:00	14.8	14.8	11.1	11.1	226.5	227.3
9:32:00	15.0	15.0	11.0	11.0	226.3	227.2
9:33:00	14.8	14.8	11.3	11.3	228.2	229.1
9:34:00	14.7	14.7	11.5	11.5	228.7	229.5
9:35:00	15.0	15.0	11.0	11.0	228.0	228.9
9:36:00	15.0	15.0	11.0	11.0	228.9	229.8
9:37:00	14.9	14.9	11.2	11.2	228.8	229.7
9:38:00	14.9	14.9	11.2	11.2	230.0	230.9
9:39:00	14.6	14.6	11.6	11.5	229.4	230.3
9:40:00	14.9	14.9	11.1	11.1	230.4	231.3
9:41:00	14.8	14.8	11.1	11.1	227.6	228.4
9:42:00	14.8	14.8	11.1	11.1	228.3	229.2
9:43:00	14.9	14.9	11.2	11.2	228.4	229.3
9:44:00	14.9	14.9	11.0	11.0	229.5	230.4
9:45:00	15.0	15.0	11.1	11.0	227.8	228.6
9:46:00	14.9	14.9	11.2	11.2	228.4	229.2
9:47:00	15.0	15.0	10.9	10.9	230.5	231.4
9:48:00	14.9	14.9	11.1	11.1	228.5	229.3
9:49:00	15.0	15.0	10.8	10.8	231.1	232.0
9:50:00	15.1	15.1	10.7	10.7	229.7	230.5
9:51:00	14.9	14.9	11.0	11.0	230.3	231.2
9:52:00	15.0	15.1	10.8	10.8	232.2	233.1
9:53:00	14.9	14.9	11.2	11.1	231.2	232.1
9:54:00	15.0	15.0	11.0	11.0	230.7	231.6
9:55:00	15.0	15.0	11.0	11.0	229.8	230.7
9:56:00	15.0	15.0	11.1	11.0	228.7	229.6
9:57:00	14.9	14.9	10.9	10.9	230.4	231.3

Test 2 **Kiln Stack**						
Date	12-Oct-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
9:58:00	14.9	14.9	11.0	11.0	229.4	230.3
9:59:00	15.1	15.1	10.8	10.8	230.2	231.1
10:00:00	14.9	14.9	11.1	11.1	229.6	230.5
10:01:00	14.8	14.8	11.4	11.4	230.7	231.6
10:02:00	14.9	14.9	11.3	11.3	230.6	231.5
10:03:00	14.9	14.9	11.4	11.4	230.1	230.9
10:04:00	14.9	14.9	11.4	11.4	231.1	232.0
10:05:00	14.7	14.7	11.7	11.7	231.7	232.6
10:06:00	14.8	14.8	11.6	11.6	231.1	232.0
10:07:00	15.0	15.0	11.2	11.2	230.0	230.9
10:08:00	15.0	15.0	11.1	11.1	232.6	233.5
10:09:00	15.0	15.0	10.9	10.9	225.6	226.5
10:10:00	14.9	14.9	11.0	11.0	231.5	232.4
10:11:00	14.9	14.9	11.0	11.0	229.7	230.6
10:12:00	14.8	14.8	11.2	11.2	232.3	233.2
10:13:00	14.9	14.9	11.1	11.0	230.7	231.6
10:14:00	15.0	15.0	11.0	11.0	232.9	233.8
10:15:00	15.0	15.0	10.8	10.8	229.4	230.2
10:16:00	15.0	15.0	10.7	10.7	231.6	232.5
10:17:00	15.1	15.1	10.7	10.7	230.2	231.1
10:18:00	15.0	15.0	10.9	10.9	230.8	231.7
10:19:00	15.1	15.1	10.6	10.6	231.3	232.2
10:20:00	14.9	15.0	11.0	11.0	231.1	232.0
10:21:00	14.9	14.9	11.2	11.2	230.7	231.6
10:22:00	14.8	14.8	11.3	11.3	231.4	232.3
10:23:00	14.9	14.9	11.3	11.3	231.1	232.0
10:24:00	14.7	14.7	11.6	11.6	230.3	231.2
10:25:00	15.4	15.4	10.5	10.5	228.6	229.4
10:26:00	14.9	14.9	11.3	11.3	230.9	231.7
10:27:00	14.8	14.8	11.4	11.4	229.4	230.3
10:28:00	14.9	14.9	11.3	11.3	230.6	231.5
10:29:00	14.9	14.9	11.3	11.3	230.7	231.6
10:30:00	14.8	14.8	11.5	11.5	228.5	229.4
10:31:00	14.7	14.7	11.6	11.6	228.9	229.8
10:32:00	14.7	14.7	11.7	11.7	227.5	228.4
10:33:00	14.9	14.9	11.3	11.3	229.1	230.0
10:34:00	14.9	14.9	11.2	11.2	229.5	230.4
10:35:00	15.0	15.0	10.9	10.9	229.7	230.6
10:36:00	14.9	14.9	11.0	11.0	230.9	231.8
10:37:00	15.0	15.0	10.8	10.8	232.0	232.9
10:38:00	15.1	15.1	10.7	10.7	229.1	230.0
10:39:00	14.8	14.8	11.5	11.5	228.0	228.8
10:40:00	14.8	14.8	11.6	11.6	227.3	228.2
10:41:00	15.0	15.0	10.9	10.9	228.9	229.8
10:42:00	15.0	15.0	10.9	10.8	228.8	229.6
10:43:00	15.0	15.0	11.0	11.0	228.3	229.2
10:44:00	15.0	15.0	11.1	11.1	230.7	231.5
10:45:00	15.2	15.2	10.8	10.7	229.1	230.0
10:46:00	14.7	14.7	11.4	11.4	228.9	229.8
10:47:00	14.8	14.8	11.5	11.5	229.0	229.9

Test 2 **Kiln Stack**						
Date	12-Oct-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
10:48:00	14.4	14.4	11.9	11.9	227.1	228.0
10:49:00	14.8	14.8	11.5	11.5	227.6	228.5
10:50:00	14.9	14.9	11.2	11.2	231.2	232.1
10:51:00	14.9	14.9	11.1	11.1	230.1	231.0
10:52:00	14.8	14.8	11.2	11.2	228.6	229.4
10:53:00	15.0	15.0	11.1	11.1	228.8	229.7
10:54:00	15.0	15.0	10.9	10.8	227.9	228.8
10:55:00	15.0	15.0	10.9	10.9	229.1	230.0
10:56:00	14.9	14.9	11.1	11.1	229.2	230.0
10:57:00	15.0	15.0	10.8	10.8	230.7	231.6
10:58:00	15.0	15.0	10.6	10.6	229.4	230.2
10:59:00	14.9	14.9	10.6	10.5	227.6	228.5
11:00:00	15.0	15.0	10.5	10.4	228.9	229.8
11:01:00	15.0	15.0	10.6	10.6	227.9	228.8
11:02:00	14.9	14.9	10.8	10.8	227.1	227.9
11:03:00	14.9	14.9	11.2	11.1	229.6	230.4
11:04:00	14.7	14.7	11.4	11.4	229.5	230.4
11:05:00	14.8	14.8	11.5	11.5	228.4	229.3
11:06:00	14.8	14.8	11.6	11.6	229.0	229.8
11:07:00	14.7	14.7	11.8	11.8	227.5	228.3
11:08:00	14.8	14.8	11.6	11.6	228.0	228.9
11:09:00	14.9	14.9	11.6	11.5	229.2	230.0
11:10:00	14.8	14.8	11.7	11.7	227.1	227.9
11:11:00	14.8	14.8	11.5	11.5	227.3	228.1
11:12:00	14.8	14.8	11.4	11.4	229.1	229.9
11:13:00	15.0	15.0	11.1	11.1	227.9	228.7
11:14:00	14.9	14.9	11.1	11.1	227.0	227.8
11:15:00	14.8	14.8	11.2	11.2	228.1	228.9
11:16:00	14.8	14.8	11.3	11.3	226.6	227.5
11:17:00	14.8	14.8	11.3	11.2	226.2	227.1
11:18:00	14.7	14.7	11.4	11.4	229.6	230.5
11:19:00	14.7	14.7	11.7	11.7	232.1	233.0
11:20:00	14.7	14.7	11.8	11.7	228.0	228.9
11:21:00	14.8	14.8	11.6	11.6	226.9	227.7
11:22:00	14.9	14.9	11.4	11.4	226.1	227.0
11:23:00	14.8	14.8	11.5	11.5	227.1	227.9
11:24:00	14.8	14.8	11.4	11.4	226.5	227.3
11:25:00	14.9	14.9	11.3	11.3	229.1	229.9
11:26:00	15.0	15.0	11.2	11.2	227.9	228.8
11:27:00	14.8	14.8	11.4	11.3	228.5	229.4
11:28:00	14.9	14.9	11.1	11.1	228.0	228.9
11:29:00	14.8	14.8	11.3	11.3	225.2	226.0
11:30:00	14.8	14.8	11.5	11.4	228.5	229.3
11:31:00	14.9	14.9	11.4	11.4	229.3	230.1
11:32:00	15.1	15.1	10.9	10.9	229.3	230.2
11:33:00	14.8	14.8	11.3	11.3	231.2	232.1
11:34:00	14.9	14.9	11.4	11.4	228.0	228.8
11:35:00	14.8	14.8	11.3	11.3	223.1	223.9
11:36:00	14.9	14.9	11.3	11.3	230.0	230.9
11:37:00	14.8	14.8	11.3	11.3	228.8	229.6

Test 2 **Kiln Stack**						
Date	12-Oct-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
11:38:00	14.8	14.8	11.4	11.4	227.8	228.6
11:39:00	14.8	14.8	11.3	11.3	227.1	228.0
11:40:00	16.9	16.9	8.3	8.3	180.9	181.2
11:41:00	16.5	16.5	8.7	8.7	181.5	181.8
11:42:00	16.2	16.2	8.6	8.6	181.9	182.2
11:43:00	16.3	16.3	8.8	8.8	185.1	185.5
11:44:00	16.1	16.1	8.9	8.9	188.1	188.5
11:45:00	16.0	16.0	8.8	8.8	192.5	193.0
11:46:00	16.2	16.2	8.6	8.6	194.7	195.2
11:47:00	16.2	16.2	8.3	8.3	201.8	202.4
11:48:00	16.4	16.4	8.4	8.4	204.7	205.3
11:49:00	16.3	16.3	8.6	8.6	208.7	209.4
11:50:00	16.2	16.2	8.4	8.4	209.8	210.5
11:51:00	16.3	16.3	8.0	8.0	212.3	213.0
11:52:00	16.5	16.5	8.2	8.2	210.5	211.1
11:53:00	16.4	16.4	8.1	8.1	214.0	214.7
11:54:00	16.4	16.5	8.2	8.2	212.3	213.0
11:55:00	16.4	16.5	8.8	8.8	211.4	212.1
11:56:00	16.0	16.1	9.0	9.0	216.7	217.5
11:57:00	16.0	16.0	8.6	8.6	209.5	210.1
11:58:00	16.3	16.3	8.6	8.6	209.3	209.9
11:59:00	16.3	16.3	8.7	8.7	211.3	212.0
12:00:00	16.2	16.3	8.9	8.9	211.0	211.7
12:01:00	16.3	16.3	8.9	8.9	209.8	210.4
12:02:00	16.2	16.2	8.6	8.6	208.3	208.9
12:03:00	16.3	16.3	8.7	8.7	205.2	205.8
12:04:00	16.2	16.2	8.7	8.7	208.7	209.4
12:05:00	16.2	16.2	8.9	8.8	208.3	208.9
12:06:00	16.1	16.1	8.8	8.8	212.6	213.2
12:07:00	16.3	16.3	8.7	8.7	209.8	210.4

Test 3 **Kiln Stack**						
Date	2-Oct-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
Zero Value *(Cv)*	0.0		0.0		0.0	
Direct *(C Dir)*	0		0		0	
Calibration Error *(ACE)*	0.00%	*PASS*	0.00%	*PASS*	0.00%	*PASS*
System Initial *(Csi)*	0.02		0.03		1.5	
System Post *(Csf)*	0.01		0.04		1.9	
Average *(Co)*	0.02		0.04		1.70	
System Bias Initial *(SBi)*	0.1%	*PASS*	0.2%	*PASS*	0.3%	*PASS*
System Bias Post *(SBf)*	0.0%	*PASS*	0.2%	*PASS*	0.4%	*PASS*
Drift Assessment *(D)*	-0.05%	*PASS*	0.05%	*PASS*	0.08%	*PASS*
Mid						
Mid Value *(Cv)*	10.0		10.30		152.0	
Direct *(C Dir)*	10.0		10.3		151.6	
Calibration Error *(ACE)*	0.00%	*PASS*	0.00%	*PASS*	-0.08%	*PASS*
System Initial *(Csi)*	10.2		10.3		154	
System Post *(Csf)*	10		10.1		155	
Average *(Cm)*	10.1		10.3		154.5	
System Bias Initial *(SBi)*	1.0%	*PASS*	0.0%	*PASS*	0.5%	*PASS*
System Bias Post *(SBf)*	0.0%	*PASS*	-1.0%	*PASS*	0.7%	*PASS*
Drift Assessment *(D)*	-0.95%	*PASS*	-1.00%	*PASS*	0.20%	*PASS*
High						
High Value *(CS/Cv)*	21.00		20.0		500.0	
Direct *(C Dir)*	20.85		20.1		498.0	
Calibration Error *(ACE)*	-0.71%	*PASS*	0.50%	*PASS*	-0.40%	*PASS*
System Initial *(Csi)*						
System Post *(Csf)*						
Average *(Cm)*	-		-		-	
System Bias Initial *(SBi)*	N/A	-	N/A	-	N/A	-
System Bias Post *(SBf)*	N/A	-	N/A	-	N/A	-
Drift Assessment *(D)*	N/A	-	N/A	-	N/A	-
Analyser Span (Range)	25		20		100	
Average	15.11	14.97	10.57	10.57	236.68	233.75
Time	**Recorded**	**Corrected**	**Recorded**	**Corrected**	**Recorded**	**Corrected**
13:57:00	14.7	14.6	11.0	11.0	243.5	240.5
13:58:00	14.7	14.5	11.0	11.0	242.1	239.2
13:59:00	14.7	14.5	11.0	11.0	242.7	239.7
14:00:00	14.6	14.5	11.0	11.0	242.2	239.2
14:01:00	14.7	14.5	11.0	11.0	243.2	240.2
14:02:00	14.7	14.6	10.9	10.9	245.1	242.1
14:03:00	14.7	14.6	10.9	10.9	241.9	239.0
14:04:00	14.8	14.6	10.9	10.9	243.4	240.4
14:05:00	14.7	14.5	10.9	10.9	244.2	241.3
14:06:00	14.6	14.5	10.9	10.9	240.0	237.0
14:07:00	14.6	14.5	11.0	11.0	242.5	239.6
14:08:00	14.6	14.5	11.0	11.0	240.9	237.9
14:09:00	14.5	14.4	11.1	11.1	240.7	237.7
14:10:00	14.6	14.5	11.0	11.0	241.9	238.9
14:11:00	14.5	14.4	11.0	11.0	241.6	238.7
14:12:00	14.6	14.5	11.0	11.0	240.1	237.2
14:13:00	14.6	14.4	11.0	11.0	240.6	237.6
14:14:00	14.6	14.5	11.0	11.0	240.4	237.4
14:15:00	14.6	14.5	11.0	11.0	241.2	238.2
14:16:00	14.5	14.4	11.0	11.0	243.7	240.8

Test 3 **Kiln Stack**						
Date	2-Oct-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
14:17:00	14.5	14.3	11.1	11.1	247.5	244.6
14:18:00	14.5	14.4	11.0	11.0	244.5	241.6
14:19:00	14.5	14.4	11.1	11.1	243.8	240.8
14:20:00	14.5	14.4	11.0	11.0	245.6	242.6
14:21:00	14.5	14.4	11.1	11.1	244.5	241.5
14:22:00	14.4	14.3	11.1	11.1	243.6	240.7
14:23:00	14.5	14.4	11.1	11.1	246.9	243.9
14:24:00	14.6	14.4	11.0	11.0	245.6	242.7
14:25:00	14.7	14.6	10.9	10.9	245.6	242.6
14:26:00	14.8	14.6	10.9	10.9	244.1	241.1
14:27:00	14.8	14.7	10.9	10.9	246.2	243.2
14:28:00	14.8	14.7	10.8	10.8	244.9	241.9
14:29:00	14.8	14.7	10.8	10.8	242.4	239.4
14:30:00	14.8	14.6	10.9	10.9	242.5	239.6
14:31:00	14.9	14.7	10.8	10.8	242.5	239.5
14:32:00	14.9	14.8	10.8	10.8	242.9	239.9
14:33:00	14.9	14.7	10.8	10.8	244.2	241.3
14:34:00	15.0	14.9	10.7	10.7	243.0	240.0
14:35:00	15.0	14.8	10.7	10.7	243.7	240.7
14:36:00	15.0	14.9	10.7	10.7	243.9	240.9
14:37:00	15.0	14.9	10.6	10.6	244.6	241.6
14:38:00	15.0	14.9	10.7	10.7	244.1	241.1
14:39:00	15.0	14.9	10.6	10.6	242.8	239.9
14:40:00	14.7	14.6	10.4	10.4	241.5	238.5
14:41:00	14.7	14.6	10.4	10.4	241.3	238.4
14:42:00	14.7	14.6	10.4	10.4	243.2	240.2
14:43:00	14.7	14.6	10.5	10.5	243.7	240.7
14:44:00	14.7	14.6	10.5	10.5	243.0	240.0
14:45:00	14.7	14.6	10.5	10.5	243.9	240.9
14:46:00	14.7	14.6	10.5	10.5	243.8	240.8
14:47:00	14.7	14.6	10.5	10.5	245.0	242.0
14:48:00	14.7	14.6	10.5	10.5	244.4	241.5
14:49:00	14.7	14.6	10.8	10.8	245.4	242.5
14:50:00	14.8	14.7	10.9	10.9	242.6	239.6
14:51:00	17.4	17.3	10.9	10.9	243.3	240.4
14:52:00	17.1	17.0	11.0	11.0	243.4	240.4
14:53:00	15.0	14.9	10.9	10.9	244.5	241.6
14:54:00	15.2	15.0	10.9	10.9	242.8	239.8
14:55:00	15.1	15.0	10.9	10.9	243.4	240.4
14:56:00	15.3	15.1	10.8	10.8	245.5	242.6
14:57:00	15.2	15.1	10.7	10.7	243.5	240.5
14:58:00	15.3	15.2	10.7	10.7	246.1	243.1
14:59:00	15.4	15.2	10.7	10.7	244.7	241.7
15:00:00	15.5	15.3	10.9	10.9	245.3	242.3
15:01:00	14.7	14.5	11.0	11.0	247.2	244.2
15:02:00	14.7	14.5	11.0	11.0	246.2	243.2
15:03:00	14.7	14.6	10.9	10.9	245.7	242.8
15:04:00	14.7	14.6	10.9	10.9	244.8	241.8
15:05:00	14.8	14.7	10.9	10.9	243.7	240.7
15:06:00	14.8	14.6	10.9	10.9	245.4	242.4

Test 3 **Kiln Stack**						
Date	2-Oct-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
15:07:00	14.9	14.7	10.8	10.8	244.4	241.5
15:08:00	14.8	14.7	10.9	10.9	245.2	242.3
15:09:00	14.8	14.7	10.8	10.8	244.6	241.7
15:10:00	14.7	14.6	10.9	10.9	245.7	242.7
15:11:00	14.7	14.6	10.9	10.9	245.6	242.7
15:12:00	14.6	14.5	11.0	11.0	245.1	242.1
15:13:00	14.7	14.6	10.9	10.9	246.1	243.1
15:14:00	14.7	14.6	10.9	10.9	246.7	243.7
15:15:00	14.8	14.6	10.9	10.9	246.1	243.2
15:16:00	14.9	14.8	10.8	10.8	245.0	242.0
15:17:00	15.1	14.9	10.7	10.7	247.6	244.6
15:18:00	15.1	14.9	10.7	10.7	240.6	237.7
15:19:00	15.0	14.9	10.7	10.7	246.5	243.5
15:20:00	15.0	14.8	10.8	10.8	244.7	241.8
15:21:00	15.1	15.0	10.7	10.7	247.3	244.3
15:22:00	15.2	15.0	10.6	10.6	245.7	242.7
15:23:00	15.1	15.0	10.7	10.7	247.9	244.9
15:24:00	15.3	15.1	10.5	10.5	244.4	241.4
15:25:00	15.2	15.1	10.6	10.6	246.6	243.6
15:26:00	15.3	15.2	10.5	10.5	245.2	242.2
15:27:00	15.4	15.2	10.4	10.4	245.8	242.8
15:28:00	15.5	15.3	10.4	10.4	246.3	243.3
15:29:00	15.4	15.3	10.3	10.3	246.1	243.1
15:30:00	15.7	15.6	10.1	10.1	245.7	242.7
15:31:00	16.0	15.8	10.0	10.0	246.4	243.4
15:32:00	16.1	15.9	9.9	9.9	246.1	243.2
15:33:00	16.0	15.9	9.9	9.9	245.3	242.3
15:34:00	16.0	15.9	9.9	9.9	243.6	240.6
15:35:00	16.0	15.8	9.9	9.9	245.9	242.9
15:36:00	16.0	15.9	9.9	9.9	244.4	241.4
15:37:00	16.0	15.9	9.9	9.9	245.6	242.6
15:38:00	16.0	15.9	9.9	9.9	245.7	242.7
15:39:00	16.0	15.8	10.0	10.0	243.5	240.5
15:40:00	16.0	15.8	10.0	10.0	243.9	240.9
15:41:00	16.0	15.8	10.0	10.0	242.5	239.6
15:42:00	16.0	15.9	9.9	9.9	244.1	241.1
15:43:00	16.0	15.9	9.9	9.9	244.5	241.6
15:44:00	15.9	15.8	10.0	10.0	244.7	241.8
15:45:00	16.0	15.8	10.0	10.0	245.9	242.9
15:46:00	15.9	15.8	10.0	10.0	247.0	244.0
15:47:00	15.9	15.7	10.0	10.0	244.1	241.2
15:48:00	16.0	15.8	10.0	10.0	243.0	240.0
15:49:00	16.0	15.8	10.0	10.0	242.3	239.4
15:50:00	16.0	15.8	10.0	10.0	243.9	240.9
15:51:00	15.9	15.8	10.0	10.0	243.8	240.8
15:52:00	15.9	15.8	10.0	10.0	243.3	240.3
15:53:00	15.9	15.8	10.0	10.0	245.7	242.7
15:54:00	15.9	15.8	10.0	10.0	244.1	241.1
15:55:00	15.9	15.8	10.0	10.0	243.9	240.9
15:56:00	15.9	15.7	10.0	10.0	244.0	241.1

Test 3 **Kiln Stack**						
Date	2-Oct-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
15:57:00	15.8	15.6	10.1	10.1	242.1	239.2
15:58:00	15.8	15.7	10.0	10.0	242.6	239.6
15:59:00	15.8	15.6	10.1	10.1	246.2	243.3
16:00:00	15.5	15.4	10.3	10.3	245.1	242.1
16:01:00	15.7	15.6	10.1	10.1	243.6	240.6
16:02:00	15.6	15.4	10.3	10.3	243.8	240.8
16:03:00	15.5	15.4	10.3	10.3	242.9	239.9
16:04:00	15.1	15.0	10.6	10.6	244.1	241.1
16:05:00	15.5	15.4	10.3	10.3	244.2	241.2
16:06:00	15.4	15.3	10.3	10.3	245.7	242.7
16:07:00	15.4	15.3	10.3	10.3	244.4	241.4
16:08:00	14.8	14.7	10.7	10.7	242.6	239.6
16:09:00	15.1	14.9	10.6	10.6	243.9	241.0
16:10:00	15.2	15.1	10.4	10.4	242.9	240.0
16:11:00	15.4	15.3	10.3	10.3	242.1	239.1
16:12:00	15.5	15.3	10.3	10.3	244.6	241.6
16:13:00	15.3	15.1	10.4	10.4	244.5	241.5
16:14:00	15.0	14.8	10.6	10.6	243.4	240.5
16:15:00	15.1	15.0	10.5	10.5	244.0	241.0
16:16:00	15.3	15.2	10.4	10.4	242.5	239.5
16:17:00	15.1	15.0	10.6	10.6	243.0	240.1
16:18:00	15.2	15.1	10.5	10.5	244.2	241.2
16:19:00	15.1	14.9	10.6	10.6	242.1	239.1
16:20:00	15.2	15.1	10.5	10.5	242.3	239.3
16:21:00	15.2	15.1	10.5	10.5	244.1	241.1
16:22:00	15.3	15.1	10.5	10.5	242.9	239.9
16:23:00	15.1	14.9	10.6	10.6	242.0	239.0
16:24:00	15.1	15.0	10.6	10.6	243.1	240.1
16:25:00	15.1	14.9	10.6	10.6	241.6	238.7
16:26:00	15.1	14.9	10.6	10.6	241.2	238.3
16:27:00	15.2	15.1	10.6	10.6	244.6	241.6
16:28:00	15.2	15.1	10.5	10.5	247.1	244.1
16:29:00	15.2	15.0	10.6	10.6	243.0	240.0
16:30:00	15.3	15.1	10.5	10.5	241.9	238.9
16:31:00	15.2	15.0	10.6	10.6	241.1	238.2
16:32:00	15.3	15.2	10.5	10.5	242.1	239.1
16:33:00	15.3	15.1	10.5	10.5	241.5	238.5
16:34:00	15.3	15.2	10.5	10.5	244.1	241.1
16:35:00	15.2	15.1	10.5	10.5	242.9	239.9
16:36:00	15.2	15.0	10.6	10.6	243.5	240.6
16:37:00	15.1	15.0	10.6	10.6	243.0	240.1
16:38:00	15.3	15.1	10.4	10.4	240.2	237.3
16:39:00	15.2	15.1	10.5	10.5	243.5	240.5
16:40:00	15.2	15.0	10.5	10.5	244.3	241.3
16:41:00	15.0	14.9	10.6	10.6	244.3	241.3
16:42:00	15.0	14.9	10.6	10.6	246.2	243.2
16:43:00	15.1	14.9	10.6	10.6	243.0	240.0
16:44:00	15.0	14.9	10.6	10.6	238.1	235.2
16:45:00	15.1	14.9	10.6	10.6	245.0	242.0
16:46:00	15.1	15.0	10.6	10.6	243.8	240.8

Test 3 **Kiln Stack**						
Date	2-Oct-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
16:47:00	15.0	14.9	10.6	10.6	242.8	239.8
16:48:00	15.2	15.1	10.4	10.4	242.1	239.2
16:49:00	15.1	14.9	10.6	10.6	195.9	193.1
16:50:00	15.1	14.9	10.6	10.6	196.5	193.8
16:51:00	15.0	14.9	10.6	10.6	196.9	194.2
16:52:00	15.0	14.9	10.6	10.6	200.1	197.4
16:53:00	15.0	14.9	10.6	10.6	203.1	200.3
16:54:00	14.9	14.7	10.7	10.7	207.5	204.7
16:55:00	14.8	14.7	10.8	10.8	209.7	206.9
16:56:00	14.8	14.6	10.8	10.8	216.8	214.0
16:57:00	14.8	14.7	10.8	10.8	219.7	216.9
16:58:00	14.7	14.6	10.8	10.8	223.7	220.9
16:59:00	14.8	14.7	10.7	10.7	224.8	221.9
17:00:00	15.0	14.8	10.6	10.6	227.3	224.4
17:01:00	15.0	14.9	10.6	10.6	225.5	222.6
17:02:00	14.9	14.8	10.7	10.7	229.0	226.1
17:03:00	15.1	14.9	10.6	10.6	227.3	224.4
17:04:00	15.3	15.1	10.4	10.4	226.4	223.5
17:05:00	15.2	15.0	10.5	10.5	231.7	228.8
17:06:00	15.2	15.0	10.5	10.5	224.5	221.6
17:07:00	15.0	14.9	10.6	10.6	224.3	221.4
17:08:00	15.1	15.0	10.5	10.5	226.3	223.4
17:09:00	15.3	15.2	10.3	10.3	226.0	223.1
17:10:00	15.3	15.1	10.4	10.4	224.8	221.9
17:11:00	15.1	14.9	10.5	10.5	223.3	220.4
17:12:00	14.9	14.7	10.7	10.7	220.2	217.3
17:13:00	15.1	15.0	10.5	10.5	223.7	220.9
17:14:00	15.2	15.1	10.4	10.4	223.3	220.4
17:15:00	15.0	14.9	10.5	10.5	227.6	224.7
17:16:00	15.1	15.0	10.5	10.5	224.8	221.9
17:17:00	15.2	15.1	10.4	10.4	224.1	221.3
17:18:00	15.2	15.0	10.5	10.5	224.7	221.9
17:19:00	15.1	15.0	10.5	10.5	225.1	222.2
17:20:00	15.2	15.0	10.4	10.4	225.8	222.9
17:21:00	15.3	15.2	10.3	10.3	226.3	223.5
17:22:00	15.3	15.2	10.3	10.3	221.9	219.0
17:23:00	15.1	15.0	10.4	10.4	223.0	220.2
17:24:00	15.0	14.9	10.6	10.6	223.7	220.8
17:25:00	15.1	14.9	10.5	10.5	223.5	220.7
17:26:00	15.3	15.2	10.3	10.3	221.8	218.9
17:27:00	15.3	15.1	10.4	10.4	225.1	222.2
17:28:00	14.9	14.8	10.6	10.6	224.2	221.3
17:29:00	15.0	14.9	10.5	10.5	222.8	220.0
17:30:00	15.1	14.9	10.5	10.5	221.3	218.5
17:31:00	15.3	15.1	10.4	10.4	217.3	214.4
17:32:00	15.3	15.1	10.4	10.4	217.0	214.2
17:33:00	15.4	15.3	10.3	10.3	220.5	217.6
17:34:00	15.2	15.1	10.4	10.4	221.4	218.6
17:35:00	15.2	15.1	10.4	10.4	222.7	219.8
17:36:00	15.4	15.2	10.3	10.3	220.9	218.1

Test 3 **Kiln Stack**						
Date	2-Oct-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
17:37:00	15.3	15.2	10.3	10.3	222.8	219.9
17:38:00	15.2	15.1	10.4	10.4	223.7	220.8
17:39:00	14.9	14.8	10.6	10.6	223.8	221.0
17:40:00	15.0	14.8	10.6	10.6	223.4	220.5
17:41:00	14.9	14.8	10.6	10.6	223.7	220.8
17:42:00	15.0	14.8	10.6	10.6	222.4	219.5
17:43:00	14.8	14.7	10.6	10.6	223.0	220.2
17:44:00	14.7	14.6	10.7	10.7	223.4	220.6
17:45:00	14.8	14.7	10.7	10.7	225.1	222.3
17:46:00	14.6	14.5	10.8	10.8	224.9	222.0
17:47:00	14.7	14.6	10.7	10.7	224.5	221.6
17:48:00	14.6	14.5	10.8	10.8	222.6	219.7
17:49:00	14.5	14.3	10.9	10.9	222.7	219.8
17:50:00	14.5	14.4	10.9	10.9	222.2	219.3
17:51:00	14.6	14.4	10.8	10.8	225.2	222.4
17:52:00	14.5	14.4	10.9	10.9	228.1	225.2
17:53:00	14.8	14.6	10.7	10.7	229.4	226.5
17:54:00	14.7	14.6	10.7	10.7	230.0	227.1
17:55:00	15.0	14.8	10.5	10.5	227.9	225.1
17:56:00	14.8	14.6	10.7	10.7	226.9	224.0
17:57:00	14.8	14.7	10.7	10.7	225.6	222.7
17:58:00	14.8	14.7	10.6	10.6	224.9	222.0
17:59:00	14.9	14.7	10.6	10.6	225.3	222.4
18:00:00	15.0	14.8	10.5	10.5	225.9	223.0
18:01:00	15.0	14.9	10.5	10.5	225.8	222.9
18:02:00	15.0	14.9	10.5	10.5	225.0	222.1
18:03:00	15.0	14.9	10.5	10.5	222.9	220.1
18:04:00	15.1	15.0	10.4	10.4	223.1	220.2
18:05:00	15.0	14.8	10.5	10.5	229.7	226.8
18:06:00	14.9	14.8	10.6	10.6	229.1	226.3
18:07:00	15.1	14.9	10.5	10.5	224.7	221.9
18:08:00	15.0	14.8	10.5	10.5	224.6	221.7
18:09:00	15.1	15.0	10.4	10.4	224.6	221.8
18:10:00	15.1	15.0	10.4	10.4	224.8	221.9
18:11:00	15.1	14.9	10.4	10.4	226.6	223.7
18:12:00	15.1	14.9	10.5	10.5	226.9	224.0
18:13:00	14.9	14.7	10.6	10.6	227.8	224.9
18:14:00	15.0	14.9	10.5	10.5	227.4	224.5
18:15:00	14.8	14.7	10.6	10.6	228.0	225.1
18:16:00	15.0	14.8	10.5	10.5	226.6	223.7
18:17:00	15.0	14.9	10.5	10.5	229.7	226.8
18:18:00	15.0	14.9	10.5	10.5	225.7	222.8

Summary of CEM Data

Kiln Stack, LCF

O_2 (%)	CO (ppm)	CO_2 (%)
13.3	307.8	10.9

Test ID: Date: 4-Dec-18

Time	O_2 (%)	CO (ppm)	CO_2 (%)
13:02 to 18:25	13.2	259.3	10.9

Test ID: Date: 5-Dec-18

Time	O_2 (%)	CO (ppm)	CO_2 (%)
9:06 to 13:30	13.3	264.8	11.0

Test ID: Date: 6-Dec-18

Time	O_2 (%)	CO (ppm)	CO_2 (%)
9:08 to 18:10	13.5	399.3	10.8

Test 1 **Kiln Stack**						
Date	4-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
Zero Value *(Cv)*	0.0		0.0		0.0	
Direct *(C Dir)*	0		0		0	
Calibration Error *(ACE)*	0.00%	*PASS*	0.00%	*PASS*	0.00%	*PASS*
System Initial *(Csi)*	0.02		0.05		1.3	
System Post *(Csf)*	0.03		0.06		1.6	
Average *(Co)*	0.03		0.06		1.45	
System Bias Initial *(SBi)*	0.1%	*PASS*	0.3%	*PASS*	0.3%	*PASS*
System Bias Post *(SBf)*	0.1%	*PASS*	0.3%	*PASS*	0.3%	*PASS*
Drift Assessment *(D)*	0.05%	*PASS*	0.05%	*PASS*	0.06%	*PASS*
Mid						
Mid Value *(Cv)*	10.0		10.30		152.0	
Direct *(C Dir)*	10.0		10.3		152	
Calibration Error *(ACE)*	0.00%	*PASS*	0.00%	*PASS*	0.00%	*PASS*
System Initial *(Csi)*	9.87		10.05		154.3	
System Post *(Csf)*	9.99		10.2		154	
Average *(Cm)*	9.9		10.05		154.2	
System Bias Initial *(SBi)*	-0.6%	*PASS*	-1.3%	*PASS*	0.5%	*PASS*
System Bias Post *(SBf)*	0.0%	*PASS*	-0.5%	*PASS*	0.4%	*PASS*
Drift Assessment *(D)*	0.57%	*PASS*	0.75%	*PASS*	-0.06%	*PASS*
High						
High Value *(CS/Cv)*	21.00		20.0		500.0	
Direct *(C Dir)*	20.85		20.1		498.0	
Calibration Error *(ACE)*	-0.71%	*PASS*	0.50%	*PASS*	-0.40%	*PASS*
System Initial *(Csi)*						
System Post *(Csf)*						
Average *(Cm)*	-		-		-	
System Bias Initial *(SBi)*	N/A	-	N/A	-	N/A	-
System Bias Post *(SBf)*	N/A	-	N/A	-	N/A	-
Drift Assessment *(D)*	N/A	-	N/A	-	N/A	-
Analyser Span (Range)	25		20		100	
Average	13.11	13.21	10.59	10.86	261.98	259.34
Time	**Recorded**	**Corrected**	**Recorded**	**Corrected**	**Recorded**	**Corrected**
13:02:00	13.1	13.2	12.0	12.3	315.6	312.7
13:03:00	13.1	13.2	10.5	10.8	311.5	308.6
13:04:00	13.1	13.2	10.5	10.8	295.2	292.4
13:05:00	13.1	13.2	10.5	10.8	298.7	295.9
13:06:00	13.0	13.1	10.6	10.8	300.1	297.3
13:07:00	13.0	13.1	10.6	10.8	317.1	314.2
13:08:00	13.0	13.1	10.6	10.9	319.5	316.6
13:09:00	13.0	13.1	10.6	10.9	304.2	301.4
13:10:00	12.9	13.0	10.6	10.9	306.8	304.0
13:11:00	12.9	13.0	10.7	11.0	292.2	289.4
13:12:00	12.8	12.9	10.7	11.0	286.7	283.9
13:13:00	12.9	13.0	10.7	10.9	303.3	300.5
13:14:00	12.8	12.9	10.8	11.0	314.1	311.2
13:15:00	12.9	13.0	10.7	11.0	316.3	313.4
13:16:00	12.8	12.9	10.8	11.0	304.9	302.0
13:17:00	12.8	12.9	10.7	11.0	299.6	296.8
13:18:00	12.8	12.9	10.7	11.0	302.9	300.0
13:19:00	12.8	12.9	10.7	11.0	300.6	297.8
13:20:00	12.8	12.9	10.8	11.0	301.7	298.9
13:21:00	12.8	12.9	10.7	11.0	318.7	315.8

Test 1 **Kiln Stack**						
Date	4-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
13:22:00	12.8	12.9	10.7	11.0	321.6	318.7
13:23:00	12.9	13.0	10.7	11.0	324.7	321.8
13:24:00	12.8	12.9	10.7	11.0	318.3	315.4
13:25:00	12.9	13.0	10.7	11.0	326.6	323.7
13:26:00	12.8	12.9	10.7	11.0	337.7	334.7
13:27:00	12.9	13.0	10.7	11.0	323.2	320.3
13:28:00	12.8	12.9	10.7	11.0	332.1	329.1
13:29:00	12.9	13.0	10.7	10.9	326.0	323.1
13:30:00	12.8	12.9	10.7	11.0	316.3	313.4
13:31:00	12.8	12.9	10.7	11.0	326.6	323.7
13:32:00	12.8	12.9	10.7	11.0	333.5	330.5
13:33:00	12.7	12.8	10.8	11.0	338.6	335.6
13:34:00	12.8	12.9	10.7	11.0	348.8	345.7
13:35:00	12.7	12.8	10.8	11.0	344.2	341.2
13:36:00	12.8	12.9	10.7	11.0	325.1	322.1
13:37:00	12.9	13.0	10.6	10.9	340.0	337.0
13:38:00	12.8	12.9	10.7	11.0	326.3	323.4
13:39:00	12.9	13.0	10.7	10.9	331.4	328.4
13:40:00	12.8	12.9	10.7	11.0	343.5	340.5
13:41:00	12.9	13.0	10.7	11.0	332.1	329.2
13:42:00	12.9	13.0	10.7	10.9	323.0	320.0
13:43:00	12.9	13.0	10.6	10.9	328.9	325.9
13:44:00	13.1	13.2	10.7	10.9	316.9	314.0
13:45:00	13.1	13.2	10.6	10.9	325.3	322.3
13:46:00	13.1	13.2	10.6	10.8	332.0	329.0
13:47:00	13.2	13.3	10.5	10.8	329.1	326.1
13:48:00	13.2	13.3	10.5	10.8	322.2	319.2
13:49:00	13.1	13.2	10.6	10.8	313.7	310.8
13:50:00	13.1	13.2	10.5	10.8	334.3	331.4
13:51:00	13.0	13.1	10.6	10.9	330.1	327.1
13:52:00	13.1	13.2	10.6	10.9	325.7	322.8
13:53:00	13.0	13.1	10.7	10.9	332.1	329.1
13:54:00	13.0	13.1	10.7	10.9	323.7	320.8
13:55:00	13.0	13.1	10.6	10.9	317.6	314.7
13:56:00	13.0	13.1	10.6	10.9	327.0	324.1
13:57:00	13.0	13.1	10.6	10.9	344.7	341.7
13:58:00	13.1	13.2	10.6	10.9	330.8	327.9
13:59:00	13.0	13.1	10.6	10.9	324.2	321.3
14:00:00	13.0	13.1	10.6	10.9	316.9	314.0
14:01:00	13.0	13.1	10.6	10.9	337.7	334.7
14:02:00	13.0	13.1	10.6	10.8	245.9	243.3
14:03:00	13.0	13.1	10.6	10.9	249.4	246.8
14:04:00	13.0	13.1	10.6	10.9	234.4	231.9
14:05:00	13.0	13.1	10.6	10.9	223.3	220.9
14:06:00	13.0	13.1	10.6	10.9	225.3	222.9
14:07:00	13.0	13.1	10.7	10.9	241.0	238.4
14:08:00	13.3	13.4	10.9	11.2	255.5	252.9
14:09:00	13.2	13.3	11.0	11.3	249.6	247.0
14:10:00	13.2	13.3	11.0	11.3	244.7	242.1
14:11:00	13.1	13.2	11.1	11.4	234.5	232.0

Test 1 **Kiln Stack**						
Date	4-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
14:12:00	13.2	13.3	11.0	11.3	240.1	237.6
14:13:00	13.2	13.3	11.0	11.3	232.9	230.4
14:14:00	13.3	13.4	10.9	11.2	248.2	245.6
14:15:00	13.3	13.4	10.9	11.2	254.0	251.3
14:16:00	13.3	13.4	10.9	11.2	254.3	251.7
14:17:00	13.2	13.3	11.0	11.3	241.9	239.4
14:18:00	13.3	13.4	11.0	11.2	231.9	229.4
14:19:00	13.3	13.4	10.9	11.2	233.7	231.2
14:20:00	13.3	13.4	11.0	11.2	235.8	233.3
14:21:00	13.2	13.3	11.0	11.3	221.0	218.6
14:22:00	13.3	13.4	10.9	11.2	226.6	224.1
14:23:00	13.3	13.4	10.9	11.2	232.2	229.7
14:24:00	13.3	13.4	10.9	11.2	206.0	203.6
14:25:00	13.3	13.4	10.9	11.2	203.3	200.9
14:26:00	13.2	13.3	11.0	11.3	223.8	221.3
14:27:00	13.2	13.3	11.0	11.2	219.4	216.9
14:28:00	13.2	13.3	11.0	11.2	216.7	214.3
14:29:00	13.2	13.3	11.0	11.2	211.0	208.6
14:30:00	13.2	13.3	11.0	11.3	216.5	214.0
14:31:00	13.2	13.3	11.0	11.3	214.2	211.7
14:32:00	13.2	13.3	11.0	11.2	225.3	222.8
14:33:00	13.2	13.3	10.9	11.2	211.7	209.3
14:34:00	13.2	13.3	10.9	11.2	240.0	237.4
14:35:00	13.3	13.4	10.9	11.2	216.4	214.0
14:36:00	13.2	13.3	10.9	11.2	197.2	194.8
14:37:00	13.2	13.3	10.9	11.2	203.3	200.9
14:38:00	13.2	13.3	10.9	11.2	211.3	208.9
14:39:00	13.2	13.3	10.9	11.1	241.2	238.6
14:40:00	13.2	13.3	10.9	11.1	230.1	227.6
14:41:00	13.2	13.3	10.8	11.1	229.0	226.5
14:42:00	13.3	13.4	10.8	11.1	205.6	203.2
14:43:00	13.3	13.4	10.8	11.1	199.5	197.1
14:44:00	13.2	13.3	10.8	11.1	212.2	209.8
14:45:00	13.3	13.4	10.8	11.1	224.3	221.8
14:46:00	13.3	13.4	10.8	11.0	222.0	219.5
14:47:00	13.3	13.4	10.7	11.0	221.9	219.5
14:48:00	13.4	13.5	10.7	11.0	213.9	211.5
14:49:00	13.3	13.4	10.7	11.0	217.0	214.6
14:50:00	13.3	13.4	10.7	10.9	220.4	218.0
14:51:00	13.4	13.5	10.6	10.9	242.9	240.4
14:52:00	13.4	13.5	10.6	10.9	225.0	222.5
14:53:00	13.5	13.6	10.6	10.8	255.1	252.4
14:54:00	13.4	13.5	10.6	10.9	263.9	261.2
14:55:00	13.4	13.5	10.6	10.9	221.5	219.1
14:56:00	13.3	13.4	10.6	10.9	216.2	213.8
14:57:00	13.3	13.4	10.7	11.0	227.6	225.2
14:58:00	13.2	13.4	10.7	11.0	224.7	222.2
14:59:00	13.1	13.2	10.6	10.9	229.9	227.4
15:00:00	13.1	13.2	10.5	10.8	224.6	222.1
15:01:00	13.2	13.3	10.5	10.7	218.5	216.1

Test 1 **Kiln Stack**						
Date	4-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
15:02:00	13.2	13.3	10.5	10.8	219.4	216.9
15:03:00	13.1	13.2	10.5	10.8	228.2	225.7
15:04:00	13.1	13.2	10.5	10.8	224.6	222.1
15:05:00	13.1	13.2	10.6	10.8	239.8	237.3
15:06:00	13.1	13.2	10.6	10.8	228.5	226.0
15:07:00	13.1	13.2	10.6	10.8	199.5	197.2
15:08:00	13.2	13.3	10.5	10.7	202.9	200.5
15:09:00	13.1	13.2	10.5	10.8	205.1	202.7
15:10:00	13.1	13.2	10.6	10.8	232.6	230.1
15:11:00	13.1	13.2	10.6	10.8	231.0	228.5
15:12:00	13.1	13.3	10.5	10.8	222.2	219.7
15:13:00	13.0	13.1	10.6	10.9	212.1	209.6
15:14:00	13.1	13.2	10.6	10.9	193.3	191.0
15:15:00	13.1	13.2	10.6	10.9	210.2	207.8
15:16:00	13.0	13.1	10.7	10.9	212.2	209.8
15:17:00	13.0	13.1	10.7	11.0	213.8	211.4
15:18:00	12.9	13.0	10.8	11.1	224.4	222.0
15:19:00	13.0	13.1	10.8	11.0	217.8	215.4
15:20:00	13.0	13.1	10.8	11.1	206.4	204.0
15:21:00	12.8	12.9	10.7	11.0	196.4	194.1
15:22:00	12.9	13.0	10.6	10.9	230.9	228.4
15:23:00	12.8	12.9	10.7	10.9	216.3	213.9
15:24:00	12.8	12.9	10.7	10.9	215.4	213.0
15:25:00	12.8	12.9	10.7	11.0	223.5	221.0
15:26:00	12.9	13.0	10.7	10.9	234.1	231.6
15:27:00	12.9	13.0	10.6	10.9	204.9	202.5
15:28:00	13.0	13.1	10.6	10.8	201.3	199.0
15:29:00	12.9	13.0	10.6	10.9	205.9	203.5
15:30:00	12.9	13.0	10.6	10.9	227.6	225.1
15:31:00	12.9	13.0	10.6	10.9	202.2	199.9
15:32:00	12.9	13.0	10.6	10.8	228.7	226.2
15:33:00	12.9	13.0	10.6	10.9	244.1	241.6
15:34:00	12.8	12.9	10.7	10.9	247.5	244.9
15:35:00	12.9	12.9	10.6	10.9	255.9	253.3
15:36:00	12.9	13.0	10.6	10.9	263.4	260.8
15:37:00	12.9	13.0	10.6	10.9	251.8	249.2
15:38:00	12.9	13.0	10.6	10.9	238.8	236.3
15:39:00	12.8	12.9	10.7	10.9	230.0	227.5
15:40:00	12.8	12.9	10.6	10.9	232.0	229.4
15:41:00	12.8	12.9	10.6	10.9	244.1	241.6
15:42:00	12.8	12.9	10.6	10.9	250.2	247.6
15:43:00	12.8	12.9	10.6	10.9	264.9	262.3
15:44:00	12.8	12.9	10.6	10.9	244.3	241.7
15:45:00	12.9	13.0	10.6	10.8	243.8	241.3
15:46:00	13.0	13.1	10.5	10.8	253.6	251.0
15:47:00	13.0	13.1	10.5	10.7	256.6	254.0
15:48:00	13.0	13.1	10.4	10.7	236.4	233.9
15:49:00	13.0	13.1	10.5	10.8	247.5	244.9
15:50:00	13.0	13.1	10.5	10.7	246.1	243.5
15:51:00	13.0	13.1	10.5	10.7	237.5	234.9

Test 1 **Kiln Stack**						
Date	4-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
15:52:00	13.0	13.1	10.5	10.7	244.4	241.9
15:53:00	13.1	13.2	10.4	10.7	247.7	245.2
15:54:00	13.1	13.2	10.4	10.7	264.2	261.5
15:55:00	13.1	13.2	10.4	10.6	244.8	242.2
15:56:00	13.1	13.2	10.4	10.7	240.8	238.3
15:57:00	13.1	13.2	10.4	10.6	228.6	226.1
15:58:00	13.1	13.2	10.4	10.6	240.6	238.0
15:59:00	13.2	13.3	10.3	10.6	254.7	252.1
16:00:00	13.1	13.2	10.4	10.7	254.3	251.7
16:01:00	13.0	13.1	10.4	10.7	245.9	243.4
16:02:00	13.1	13.2	10.4	10.7	243.9	241.4
16:03:00	13.1	13.2	10.4	10.7	229.9	227.4
16:04:00	13.2	13.3	10.3	10.6	228.5	226.0
16:05:00	13.2	13.3	10.3	10.6	223.3	220.8
16:06:00	13.1	13.2	10.4	10.7	242.1	239.5
16:07:00	13.1	13.2	10.3	10.6	244.4	241.9
16:08:00	13.1	13.2	10.3	10.6	227.7	225.2
16:09:00	13.2	13.3	10.3	10.6	227.7	225.2
16:10:00	13.2	13.3	10.3	10.5	227.8	225.3
16:11:00	13.2	13.3	10.3	10.5	227.7	225.2
16:12:00	13.2	13.3	10.3	10.6	227.2	224.7
16:13:00	13.2	13.3	10.3	10.6	227.0	224.5
16:14:00	13.1	13.2	10.3	10.6	227.8	225.3
16:15:00	13.2	13.3	10.3	10.5	227.7	225.2
16:16:00	13.2	13.3	10.3	10.5	227.7	225.2
16:17:00	13.3	13.4	10.2	10.4	227.7	225.2
16:18:00	13.3	13.4	10.2	10.4	227.7	225.3
16:19:00	13.3	13.4	10.2	10.5	227.7	225.2
16:20:00	13.3	13.4	10.2	10.5	227.1	224.6
16:21:00	13.2	13.3	10.3	10.5	227.7	225.3
16:22:00	13.2	13.3	10.3	10.5	227.3	224.8
16:23:00	13.2	13.3	10.3	10.5	227.8	225.3
16:24:00	13.2	13.3	10.3	10.5	227.7	225.2
16:25:00	13.2	13.3	10.3	10.6	227.7	225.2
16:26:00	13.2	13.3	10.3	10.5	227.7	225.2
16:27:00	13.2	13.3	10.3	10.6	227.7	225.3
16:28:00	13.2	13.3	10.3	10.6	227.9	225.4
16:29:00	13.2	13.3	10.3	10.6	227.1	224.6
16:30:00	13.1	13.2	10.4	10.7	241.0	238.4
17:30:00	13.1	13.2	10.4	10.7	240.9	238.4
17:31:00	13.2	13.3	10.6	10.8	251.4	248.8
17:32:00	13.3	13.4	10.5	10.8	261.8	259.2
17:33:00	13.2	13.3	10.6	10.9	272.2	269.5
17:34:00	13.1	13.2	10.7	10.9	243.7	241.1
17:35:00	13.2	13.3	10.6	10.9	254.1	251.5
17:36:00	13.2	13.3	10.6	10.8	264.6	261.9
17:37:00	13.2	13.3	10.5	10.8	265.6	262.9
17:38:00	13.2	13.3	10.5	10.8	266.6	263.9
17:39:00	13.3	13.4	10.5	10.8	267.6	264.9
17:40:00	13.3	13.4	10.5	10.8	268.6	265.9

Test 1 Kiln Stack						
Date	4-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
17:41:00	13.3	13.4	10.5	10.7	269.6	266.9
17:42:00	13.2	13.3	10.5	10.8	270.6	267.9
17:43:00	13.3	13.4	10.5	10.7	271.6	268.9
17:44:00	13.2	13.3	10.5	10.8	272.6	269.9
17:45:00	13.2	13.3	10.5	10.7	273.6	270.9
17:46:00	13.2	13.3	10.5	10.7	274.6	271.9
17:47:00	13.2	13.3	10.5	10.8	275.6	272.9
17:48:00	13.2	13.3	10.5	10.7	276.6	273.9
17:49:00	13.3	13.4	10.4	10.7	277.6	274.9
17:50:00	13.3	13.4	10.4	10.7	278.6	275.8
17:51:00	13.2	13.4	10.4	10.7	279.6	276.8
17:52:00	13.3	13.4	10.4	10.6	280.6	277.8
17:53:00	13.3	13.4	10.3	10.6	281.6	278.8
17:54:00	13.3	13.4	10.3	10.6	282.6	279.8
17:55:00	13.3	13.4	10.3	10.6	283.6	280.8
17:56:00	13.3	13.4	10.3	10.6	284.6	281.8
17:57:00	13.3	13.4	10.3	10.6	285.6	282.8
17:58:00	13.3	13.4	10.4	10.6	286.6	283.8
17:59:00	13.2	13.3	10.4	10.6	287.6	284.8
18:00:00	13.2	13.3	10.4	10.6	288.6	285.8
18:01:00	13.2	13.3	10.4	10.7	289.6	286.8
18:02:00	13.2	13.3	10.4	10.7	290.6	287.8
18:03:00	13.2	13.3	10.4	10.7	291.6	288.8
18:04:00	13.2	13.3	10.5	10.7	292.6	289.8
18:05:00	13.2	13.3	10.4	10.7	293.6	290.8
18:06:00	13.2	13.3	10.4	10.7	294.6	291.8
18:07:00	13.2	13.3	10.4	10.7	295.6	292.8
18:08:00	13.3	13.4	10.4	10.6	296.6	293.8
18:09:00	13.2	13.3	10.4	10.6	297.6	294.8
18:10:00	13.3	13.4	10.3	10.6	298.6	295.8
18:11:00	13.3	13.4	10.3	10.6	299.6	296.8
18:12:00	13.3	13.4	10.3	10.6	300.6	297.7
18:13:00	13.3	13.4	10.3	10.6	301.6	298.7
18:14:00	13.3	13.4	10.3	10.6	302.6	299.7
18:15:00	13.3	13.4	10.4	10.6	303.6	300.7
18:16:00	13.2	13.3	10.4	10.6	304.6	301.7
18:17:00	13.2	13.3	10.4	10.6	305.6	302.7
18:18:00	13.2	13.3	10.4	10.7	306.6	303.7
18:19:00	13.3	13.4	10.4	10.7	307.6	304.7
18:20:00	13.3	13.4	10.4	10.7	308.6	305.7
18:21:00	13.3	13.4	10.5	10.7	309.6	306.7
18:22:00	13.3	13.4	10.4	10.7	310.6	307.7
18:23:00	13.3	13.4	10.4	10.7	311.6	308.7
18:24:00	13.3	13.4	10.4	10.7	312.6	309.7
18:25:00	13.2	13.3	10.4	10.6	313.6	310.7

Test 2 **Kiln Stack**						
Date	5-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
Zero Value *(Cv)*	0.0		0.0		0.0	
Direct *(C Dir)*	0		0		0	
Calibration Error *(ACE)*	0.00%	*PASS*	0.00%	*PASS*	0.00%	*PASS*
System Initial *(Csi)*	0.01		0.00		2.1	
System Post *(Csf)*	0.01		0.02		2.3	
Average *(Co)*	0.01		0.01		2.20	
System Bias Initial *(SBi)*	0.0%	*PASS*	0.0%	*PASS*	0.4%	*PASS*
System Bias Post *(SBf)*	0.0%	*PASS*	0.1%	*PASS*	0.5%	*PASS*
Drift Assessment *(D)*	0.00%	*PASS*	0.10%	*PASS*	0.04%	*PASS*
Mid						
Mid Value *(Cv)*	10.0		10.30		152.0	
Direct *(C Dir)*	10.0		10.3		151.6	
Calibration Error *(ACE)*	0.00%	*PASS*	0.00%	*PASS*	-0.08%	*PASS*
System Initial *(Csi)*	10.1		10.4		152.6	
System Post *(Csf)*	10.2		10.3		153.2	
Average *(Cm)*	10.2		10.4		152.9	
System Bias Initial *(SBi)*	0.5%	*PASS*	0.5%	*PASS*	0.2%	*PASS*
System Bias Post *(SBf)*	1.0%	*PASS*	0.0%	*PASS*	0.3%	*PASS*
Drift Assessment *(D)*	0.48%	*PASS*	-0.50%	*PASS*	0.12%	*PASS*
High						
High Value *(CS/Cv)*	21.00		20.0		500.0	
Direct *(C Dir)*	20.85		20.1		498.0	
Calibration Error *(ACE)*	-0.71%	*PASS*	0.50%	*PASS*	-0.40%	*PASS*
System Initial *(Csi)*						
System Post *(Csf)*						
Average *(Cm)*	-		-		-	
System Bias Initial *(SBi)*	N/A	-	N/A	-	N/A	-
System Bias Post *(SBf)*	N/A	-	N/A	-	N/A	-
Drift Assessment *(D)*	N/A	-	N/A	-	N/A	-
Analyser Span (Range)	25		20		100	
Average	13.51	13.31	11.14	11.03	264.75	264.82
Time	**Recorded**	**Corrected**	**Recorded**	**Corrected**	**Recorded**	**Corrected**
9:05:00	13.3	13.1	11.7	11.6	311.5	311.9
9:06:00	13.4	13.2	11.6	11.5	310.1	310.6
9:07:00	13.4	13.2	11.6	11.5	310.7	311.1
9:08:00	13.3	13.1	11.8	11.7	310.2	310.6
9:09:00	13.4	13.2	11.6	11.5	311.2	311.6
9:10:00	13.4	13.2	11.5	11.4	313.1	313.6
9:11:00	13.4	13.2	11.6	11.5	309.9	310.4
9:12:00	13.4	13.2	11.6	11.5	311.4	311.9
9:13:00	13.6	13.4	11.4	11.3	312.2	312.7
9:14:00	13.6	13.4	11.3	11.2	308.0	308.4
9:15:00	13.6	13.4	11.2	11.1	310.5	311.0
9:16:00	13.9	13.7	10.6	10.5	308.9	309.3
9:17:00	13.5	13.3	11.4	11.3	308.7	309.1
9:18:00	13.4	13.2	11.6	11.5	309.9	310.3
9:19:00	13.5	13.3	11.5	11.4	309.6	310.1
9:20:00	13.3	13.2	11.7	11.6	308.1	308.6
9:21:00	13.6	13.4	11.2	11.1	308.6	309.0
9:22:00	13.5	13.3	11.2	11.1	308.4	308.8
9:23:00	13.4	13.3	11.3	11.2	309.2	309.6
9:24:00	13.6	13.4	11.2	11.1	311.7	312.2

Test 2 **Kiln Stack**						
Date	5-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
9:25:00	13.3	13.1	11.8	11.7	315.5	316.0
9:26:00	13.7	13.5	11.2	11.1	312.5	313.0
9:27:00	13.4	13.2	11.6	11.5	326.8	327.4
9:28:00	13.5	13.3	11.2	11.1	328.6	329.2
9:29:00	13.7	13.5	10.8	10.7	327.5	328.1
9:30:00	13.5	13.3	11.3	11.2	326.6	327.2
9:31:00	13.4	13.2	11.6	11.5	329.9	330.5
9:32:00	13.4	13.2	11.5	11.4	328.6	329.3
9:33:00	13.3	13.1	11.7	11.6	328.6	329.2
9:34:00	13.3	13.1	11.7	11.6	327.1	327.7
9:35:00	13.4	13.2	11.5	11.4	329.2	329.8
9:36:00	13.4	13.2	11.6	11.5	327.9	328.5
9:37:00	13.6	13.4	11.2	11.1	325.4	325.9
9:38:00	13.3	13.1	11.6	11.5	325.5	326.1
9:39:00	13.6	13.4	11.2	11.1	325.5	326.0
9:40:00	13.5	13.3	11.4	11.3	325.9	326.4
9:41:00	13.5	13.3	11.5	11.4	327.2	327.8
9:42:00	13.3	13.2	11.7	11.6	326.0	326.6
9:43:00	13.6	13.4	11.2	11.1	326.7	327.3
9:44:00	13.6	13.4	11.4	11.3	326.9	327.5
9:45:00	13.4	13.2	11.8	11.7	327.6	328.2
9:46:00	13.4	13.2	11.5	11.4	327.1	327.7
9:47:00	13.4	13.2	11.6	11.5	325.8	326.4
9:48:00	13.4	13.2	11.5	11.4	324.5	325.1
9:49:00	13.5	13.3	11.4	11.3	324.3	324.9
9:50:00	13.3	13.1	11.7	11.6	326.2	326.8
9:51:00	13.3	13.1	11.9	11.8	326.7	327.3
9:52:00	13.5	13.3	11.4	11.3	326.0	326.6
9:53:00	13.5	13.3	11.4	11.3	326.9	327.5
9:54:00	13.4	13.2	11.6	11.5	326.8	327.4
9:55:00	13.4	13.2	11.6	11.5	348.0	348.8
9:56:00	13.2	13.0	12.0	11.8	347.4	348.2
9:57:00	13.4	13.2	11.5	11.4	348.4	349.2
9:58:00	13.4	13.2	11.5	11.4	345.6	346.3
9:59:00	13.4	13.2	11.5	11.4	346.3	347.1
10:00:00	13.4	13.2	11.6	11.5	346.4	347.2
10:01:00	13.4	13.2	11.4	11.3	347.5	348.3
10:02:00	13.5	13.3	11.5	11.3	345.8	346.5
10:03:00	13.4	13.2	11.6	11.5	346.4	347.2
10:04:00	13.5	13.3	11.3	11.2	348.5	349.3
10:05:00	13.4	13.2	11.5	11.4	346.5	347.2
10:06:00	13.6	13.4	11.2	11.1	349.1	349.9
10:07:00	13.6	13.4	11.1	11.0	347.7	348.4
10:08:00	13.5	13.3	11.4	11.3	348.3	349.1
10:09:00	13.6	13.4	11.2	11.1	350.2	351.0
10:10:00	13.5	13.3	11.6	11.4	349.2	350.0
10:11:00	13.5	13.3	11.4	11.3	348.7	349.5
10:12:00	13.5	13.3	11.4	11.3	347.8	348.6
10:13:00	13.5	13.3	11.5	11.3	346.7	347.5
10:14:00	13.5	13.3	11.3	11.2	348.4	349.2

Test 2 **Kiln Stack**						
Date	5-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
10:15:00	13.5	13.3	11.4	11.3	347.4	348.2
10:16:00	13.7	13.5	11.2	11.1	348.2	349.0
10:17:00	13.4	13.2	11.5	11.4	347.6	348.4
10:18:00	13.3	13.1	11.8	11.7	348.7	349.5
10:19:00	13.5	13.3	11.7	11.6	348.6	349.4
10:20:00	13.5	13.3	11.8	11.7	348.1	348.8
10:21:00	13.4	13.2	11.8	11.7	349.1	349.9
10:22:00	13.3	13.1	12.1	12.0	349.7	350.5
10:23:00	13.3	13.1	12.0	11.9	349.1	349.9
10:24:00	13.6	13.4	11.6	11.5	329.0	329.6
10:25:00	13.6	13.4	11.5	11.4	331.6	332.3
10:26:00	13.6	13.4	11.3	11.2	324.6	325.2
10:27:00	13.5	13.3	11.4	11.3	330.5	331.1
10:28:00	13.5	13.3	11.4	11.3	228.7	228.5
10:29:00	13.4	13.2	11.6	11.5	231.3	231.1
10:30:00	13.5	13.3	11.5	11.3	229.7	229.4
10:31:00	13.5	13.3	11.4	11.3	231.9	231.6
10:32:00	13.6	13.4	11.2	11.1	228.4	228.1
10:33:00	13.6	13.4	11.1	11.0	230.6	230.3
10:34:00	13.6	13.4	11.1	11.0	229.2	228.9
10:35:00	13.5	13.3	11.3	11.2	229.8	229.5
10:36:00	13.7	13.5	11.0	10.9	230.3	230.1
10:37:00	13.5	13.3	11.4	11.3	230.1	229.8
10:38:00	13.4	13.2	11.6	11.5	229.7	229.4
10:39:00	13.4	13.2	11.7	11.6	230.4	230.1
10:40:00	13.5	13.3	11.7	11.6	230.1	229.9
10:41:00	13.3	13.1	12.0	11.9	229.3	229.1
10:42:00	13.9	13.7	10.9	10.8	227.6	227.3
10:43:00	13.5	13.3	11.7	11.6	229.9	229.6
10:44:00	13.4	13.2	11.8	11.7	228.4	228.1
10:45:00	13.4	13.2	11.7	11.6	229.6	229.3
10:46:00	13.5	13.3	11.7	11.6	229.7	229.5
10:47:00	13.4	13.2	11.9	11.8	227.5	227.3
10:48:00	13.3	13.1	12.0	11.9	227.9	227.6
10:49:00	13.3	13.1	12.1	12.0	226.5	226.3
10:50:00	13.4	13.2	11.7	11.6	228.1	227.9
10:51:00	13.5	13.3	11.6	11.5	228.5	228.3
10:52:00	13.5	13.3	11.3	11.2	228.7	228.5
10:53:00	13.4	13.2	11.4	11.3	229.9	229.7
10:54:00	13.5	13.3	11.2	11.1	231.0	230.7
10:55:00	13.7	13.5	11.1	11.0	228.1	227.9
10:56:00	13.3	13.1	11.9	11.8	227.0	226.7
10:57:00	13.4	13.2	12.0	11.9	226.3	226.1
10:58:00	13.6	13.4	11.3	11.2	227.9	227.7
10:59:00	13.5	13.3	11.3	11.1	227.8	227.5
11:00:00	13.5	13.3	11.4	11.3	227.3	227.0
11:01:00	13.5	13.3	11.5	11.4	229.7	229.4
11:02:00	13.7	13.5	11.2	11.0	228.1	227.8
11:03:00	13.3	13.1	11.8	11.7	227.9	227.7
11:04:00	13.3	13.1	11.9	11.8	228.0	227.8

Test 2 **Kiln Stack**						
Date	5-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
11:05:00	13.0	12.8	12.3	12.2	226.1	225.8
11:06:00	13.4	13.2	11.9	11.8	226.6	226.3
11:07:00	13.4	13.2	11.6	11.5	230.2	230.0
11:08:00	13.5	13.3	11.5	11.4	229.1	228.9
11:09:00	13.4	13.2	11.6	11.5	227.6	227.3
11:10:00	13.5	13.3	11.5	11.4	227.8	227.5
11:11:00	13.6	13.4	11.3	11.1	226.9	226.6
11:12:00	13.6	13.4	11.3	11.2	228.1	227.8
11:13:00	13.5	13.3	11.5	11.4	228.2	227.9
11:14:00	13.5	13.3	11.2	11.1	229.7	229.4
11:15:00	13.6	13.4	11.0	10.9	228.4	228.1
11:16:00	13.5	13.3	11.0	10.8	226.6	226.3
11:17:00	13.5	13.3	10.9	10.7	227.9	227.7
11:18:00	13.5	13.3	11.0	10.9	226.9	226.7
11:19:00	13.4	13.2	11.2	11.1	226.1	225.8
11:20:00	13.4	13.2	11.6	11.4	228.6	228.3
11:21:00	13.3	13.1	11.8	11.7	228.5	228.2
11:22:00	13.4	13.2	11.9	11.8	227.4	227.2
11:23:00	13.4	13.2	12.0	11.9	228.0	227.7
11:24:00	13.2	13.1	12.2	12.1	226.5	226.2
11:25:00	13.4	13.2	12.0	11.9	227.0	226.8
11:26:00	13.4	13.2	12.0	11.8	238.2	238.0
11:27:00	13.3	13.1	12.1	12.0	236.1	235.9
11:28:00	13.4	13.2	11.9	11.8	236.3	236.1
11:29:00	13.3	13.1	11.8	11.7	238.1	237.9
11:30:00	13.5	13.3	11.5	11.4	236.9	236.7
11:31:00	13.5	13.3	11.5	11.4	236.0	235.8
11:32:00	13.3	13.1	11.6	11.5	237.1	236.9
11:33:00	13.3	13.1	11.7	11.6	235.6	235.4
11:34:00	13.4	13.2	11.7	11.5	235.2	235.0
11:35:00	13.3	13.1	11.8	11.7	270.6	270.7
11:36:00	13.2	13.0	12.1	12.0	273.1	273.2
11:37:00	13.2	13.0	12.2	12.0	269.0	269.1
11:38:00	13.3	13.1	12.0	11.9	267.9	268.0
11:39:00	13.4	13.2	11.8	11.7	267.1	267.2
11:40:00	13.3	13.1	11.9	11.8	268.1	268.2
11:41:00	13.3	13.2	11.8	11.7	267.5	267.6
11:42:00	13.4	13.2	11.7	11.6	270.1	270.2
11:43:00	13.5	13.3	11.6	11.5	268.9	269.0
11:44:00	13.4	13.2	11.8	11.6	269.5	269.6
11:45:00	13.5	13.3	11.5	11.4	269.0	269.1
11:46:00	13.3	13.1	11.7	11.6	266.2	266.3
11:47:00	13.4	13.2	11.9	11.7	269.5	269.6
11:48:00	13.4	13.2	11.8	11.7	270.3	270.4
11:49:00	13.7	13.5	11.3	11.2	270.3	270.4
11:50:00	13.4	13.2	11.7	11.6	272.2	272.3
11:51:00	13.4	13.2	11.8	11.6	269.0	269.1
11:52:00	13.2	13.0	11.7	11.6	264.1	264.2
11:53:00	13.2	13.0	11.7	11.6	271.0	271.1
11:54:00	13.1	12.9	11.7	11.6	269.8	269.9

Test 2 **Kiln Stack**						
Date	5-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
11:55:00	13.1	13.0	11.8	11.7	268.8	268.9
11:56:00	13.1	12.9	11.7	11.6	268.1	268.2
11:57:00	15.2	15.0	10.0	9.9	221.9	221.6
11:58:00	13.8	13.6	10.4	10.3	222.5	222.2
11:59:00	13.6	13.4	10.3	10.2	222.9	222.6
12:00:00	13.6	13.4	10.5	10.4	226.1	225.9
12:01:00	13.4	13.2	10.6	10.5	229.1	228.9
12:02:00	13.4	13.2	10.5	10.4	233.5	233.3
12:03:00	13.5	13.3	10.3	10.2	235.7	235.5
12:04:00	13.6	13.4	10.0	9.9	242.8	242.7
12:05:00	13.7	13.5	10.1	10.0	245.7	245.6
12:06:00	13.6	13.4	10.3	10.2	249.7	249.7
12:07:00	13.5	13.3	10.1	10.0	250.8	250.7
12:08:00	13.6	13.4	9.7	9.6	253.3	253.3
12:09:00	13.8	13.6	9.9	9.8	251.5	251.4
12:10:00	13.8	13.6	9.8	9.7	255.0	255.0
12:11:00	13.8	13.6	9.9	9.8	253.3	253.2
12:12:00	13.8	13.6	10.5	10.4	252.4	252.3
12:13:00	13.4	13.2	10.7	10.6	257.7	257.7
12:14:00	13.3	13.2	10.3	10.2	250.5	250.4
12:15:00	13.7	13.5	10.3	10.2	250.3	250.2
12:16:00	13.7	13.5	10.4	10.3	252.3	252.3
12:17:00	13.6	13.4	10.6	10.5	252.0	252.0
12:18:00	13.6	13.4	10.6	10.5	250.8	250.7
12:19:00	13.6	13.4	10.3	10.2	249.3	249.2
12:20:00	13.7	13.5	10.4	10.3	246.2	246.1
12:21:00	13.6	13.4	10.4	10.3	249.7	249.7
12:22:00	13.6	13.4	10.6	10.4	249.3	249.2
12:23:00	13.4	13.2	10.5	10.4	253.6	253.5
12:24:00	13.6	13.4	10.4	10.3	250.8	250.7
12:25:00	13.6	13.4	10.3	10.2	250.1	250.1
12:26:00	13.6	13.4	10.3	10.2	250.7	250.7
12:27:00	13.6	13.4	10.3	10.2	251.1	251.0
12:28:00	13.6	13.4	10.3	10.2	251.8	251.8
12:29:00	13.7	13.5	10.3	10.2	252.3	252.3
12:30:00	13.6	13.4	10.1	10.0	247.9	247.8
12:31:00	13.8	13.6	10.1	10.0	249.0	249.0
12:32:00	13.9	13.7	10.5	10.4	249.7	249.6
12:33:00	13.5	13.3	10.3	10.2	249.5	249.5
12:34:00	13.7	13.5	10.4	10.3	247.8	247.7
12:35:00	13.6	13.4	10.5	10.4	251.1	251.1
12:36:00	13.5	13.3	10.3	10.2	250.2	250.1
12:37:00	13.7	13.5	10.4	10.3	248.8	248.7
12:38:00	13.6	13.4	10.6	10.5	208.3	207.9
12:39:00	13.5	13.3	10.3	10.2	204.3	203.8
12:40:00	13.7	13.5	10.5	10.4	204.0	203.5
12:41:00	13.6	13.4	10.9	10.8	207.5	207.1
12:42:00	13.4	13.2	11.0	10.9	208.4	208.0
12:43:00	13.4	13.2	11.0	10.9	209.7	209.3
12:44:00	13.3	13.1	10.5	10.4	207.9	207.5

Test 2 **Kiln Stack**						
Date	5-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
12:45:00	13.6	13.4	10.7	10.6	209.8	209.4
12:46:00	13.5	13.3	10.6	10.5	210.7	210.3
12:47:00	13.6	13.4	10.4	10.3	210.8	210.4
12:48:00	13.7	13.5	10.4	10.3	210.4	210.0
12:49:00	13.6	13.4	10.8	10.7	210.7	210.3
12:50:00	13.4	13.2	10.5	10.4	209.4	208.9
12:51:00	13.6	13.4	10.4	10.3	210.0	209.6
12:52:00	13.6	13.4	10.2	10.1	210.4	210.0
12:53:00	13.8	13.6	10.4	10.3	212.1	211.8
12:54:00	13.7	13.5	10.0	9.9	211.9	211.5
12:55:00	13.8	13.6	10.0	9.9	211.5	211.1
12:56:00	13.8	13.6	10.2	10.1	209.6	209.2
12:57:00	13.7	13.5	10.5	10.4	209.7	209.3
12:58:00	13.6	13.4	10.6	10.5	209.2	208.8
12:59:00	13.5	13.3	10.5	10.4	212.2	211.8
13:00:00	13.5	13.3	10.5	10.4	215.1	214.7
13:01:00	13.5	13.3	10.4	10.3	216.4	216.1
13:02:00	13.6	13.4	10.0	9.9	217.0	216.6
13:03:00	13.7	13.5	10.3	10.2	214.9	214.6
13:04:00	13.6	13.4	10.2	10.1	213.9	213.5
13:05:00	13.6	13.4	9.9	9.8	212.6	212.2
13:06:00	13.7	13.5	9.8	9.7	211.9	211.5
13:07:00	13.8	13.6	9.9	9.8	212.3	211.9
13:08:00	13.8	13.6	10.1	10.0	212.9	212.5
13:09:00	13.6	13.4	10.7	10.6	212.8	212.4
13:10:00	13.6	13.4	10.6	10.5	212.0	211.6
13:11:00	13.6	13.4	10.3	10.2	209.9	209.5
13:12:00	13.6	13.4	10.4	10.3	210.1	209.6
13:13:00	13.6	13.4	10.4	10.3	216.7	216.3
13:14:00	13.6	13.4	10.6	10.5	234.1	233.9
13:15:00	13.6	13.4	10.3	10.2	229.7	229.5
13:16:00	13.6	13.4	10.5	10.4	230.7	230.5
13:17:00	13.7	13.5	10.9	10.8	231.7	231.5
13:18:00	13.6	13.4	11.0	10.9	232.7	232.5
13:19:00	13.6	13.4	11.0	10.9	233.7	233.5
13:20:00	13.4	13.2	10.5	10.4	234.7	234.5
13:21:00	13.6	13.4	10.7	10.6	235.7	235.5
13:22:00	13.6	13.4	10.6	10.5	236.7	236.6
13:23:00	13.6	13.4	10.4	10.3	237.7	237.6
13:24:00	13.6	13.4	10.4	10.3	238.7	238.6
13:25:00	13.6	13.4	10.8	10.7	239.7	239.6
13:26:00	13.7	13.5	10.5	10.4	240.7	240.6
13:27:00	13.6	13.4	10.4	10.3	241.7	241.6
13:28:00	13.8	13.6	10.2	10.1	242.7	242.6
13:29:00	13.9	13.7	10.4	10.3	243.7	243.6
13:30:00	13.5	13.3	10.0	9.9	244.7	244.6

Test 3 **Kiln Stack**						
Date	6-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
Zero Value *(Cv)*	0.0		0.0		0.0	
Direct *(C Dir)*	0		0		0	
Calibration Error *(ACE)*	0.00%	*PASS*	0.00%	*PASS*	0.00%	*PASS*
System Initial *(Csi)*	0.00		0.00		2.1	
System Post *(Csf)*	0.01		0.04		1.3	
Average *(Co)*	0.01		0.02		1.70	
System Bias Initial *(SBi)*	0.0%	*PASS*	0.0%	*PASS*	0.4%	*PASS*
System Bias Post *(SBf)*	0.0%	*PASS*	0.2%	*PASS*	0.3%	*PASS*
Drift Assessment *(D)*	0.05%	*PASS*	0.20%	*PASS*	-0.16%	*PASS*
Mid						
Mid Value *(Cv)*	10.0		10.30		152.0	
Direct *(C Dir)*	10.0		10.3		151.6	
Calibration Error *(ACE)*	0.00%	*PASS*	0.00%	*PASS*	-0.08%	*PASS*
System Initial *(Csi)*	10.1		10.1		151.5	
System Post *(Csf)*	10.3		10.2		150.9	
Average *(Cm)*	10.2		10.1		151.2	
System Bias Initial *(SBi)*	0.5%	*PASS*	-1.0%	*PASS*	0.0%	*PASS*
System Bias Post *(SBf)*	1.4%	*PASS*	-0.5%	*PASS*	-0.1%	*PASS*
Drift Assessment *(D)*	0.95%	*PASS*	0.50%	*PASS*	-0.12%	*PASS*
High						
High Value *(CS/Cv)*	21.00		20.0		500.0	
Direct *(C Dir)*	20.85		20.1		498.0	
Calibration Error *(ACE)*	-0.71%	*PASS*	0.50%	*PASS*	-0.40%	*PASS*
System Initial *(Csi)*						
System Post *(Csf)*						
Average *(Cm)*	-		-		-	
System Bias Initial *(SBi)*	N/A	-	N/A	-	N/A	-
System Bias Post *(SBf)*	N/A	-	N/A	-	N/A	-
Drift Assessment *(D)*	N/A	-	N/A	-	N/A	-
Analyser Span (Range)	25		20		100	
Average	13.74	13.47	10.57	10.78	394.45	399.31
Time	**Recorded**	**Corrected**	**Recorded**	**Corrected**	**Recorded**	**Corrected**
9:08:00	14.1	13.9	11.0	11.2	421.5	426.8
9:09:00	14.1	13.8	11.0	11.2	420.1	425.4
9:10:00	14.1	13.8	11.0	11.2	420.7	426.0
9:11:00	14.0	13.8	11.0	11.2	420.2	425.5
9:12:00	14.1	13.8	11.0	11.2	421.2	426.5
9:13:00	14.1	13.8	10.9	11.2	423.1	428.4
9:14:00	14.1	13.9	10.9	11.1	419.9	425.2
9:15:00	14.2	13.9	10.9	11.1	421.4	426.7
9:16:00	14.1	13.8	10.9	11.1	422.2	427.6
9:17:00	14.0	13.8	10.9	11.2	418.0	423.2
9:18:00	14.0	13.8	11.0	11.2	420.5	425.8
9:19:00	14.0	13.7	11.0	11.2	418.9	424.1
9:20:00	13.9	13.7	11.1	11.3	418.7	423.9
9:21:00	14.0	13.8	11.0	11.2	419.9	425.2
9:22:00	13.9	13.7	11.0	11.3	419.6	424.9
9:23:00	14.0	13.8	11.0	11.2	418.1	423.4
9:24:00	14.0	13.7	11.0	11.2	418.6	423.8
9:25:00	14.0	13.7	11.0	11.2	418.4	423.6
9:26:00	14.0	13.7	11.0	11.2	419.2	424.4
9:27:00	13.9	13.7	11.0	11.3	421.7	427.1

Test 3 **Kiln Stack**						
Date	6-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
9:28:00	13.9	13.6	11.1	11.3	425.5	430.9
9:29:00	13.9	13.7	11.0	11.3	422.5	427.9
9:30:00	13.9	13.6	11.1	11.3	436.8	442.4
9:31:00	13.9	13.6	11.0	11.3	438.6	444.2
9:32:00	13.9	13.6	11.1	11.3	437.5	443.1
9:33:00	13.8	13.6	11.1	11.3	436.6	442.2
9:34:00	13.9	13.6	11.1	11.3	439.9	445.5
9:35:00	14.0	13.7	11.0	11.2	438.6	444.2
9:36:00	14.1	13.8	10.9	11.1	438.6	444.2
9:37:00	14.2	13.9	10.9	11.1	437.1	442.7
9:38:00	14.2	13.9	10.9	11.1	439.2	444.8
9:39:00	14.2	13.9	10.8	11.1	437.9	443.5
9:40:00	14.2	13.9	10.8	11.1	535.4	542.6
9:41:00	14.2	13.9	10.9	11.1	535.5	542.8
9:42:00	14.3	14.0	10.8	11.0	535.5	542.7
9:43:00	14.3	14.0	10.8	11.0	535.9	543.1
9:44:00	14.3	14.0	10.8	11.0	537.2	544.5
9:45:00	14.4	14.1	10.7	10.9	536.0	543.2
9:46:00	14.4	14.1	10.7	10.9	536.7	544.0
9:47:00	14.4	14.1	10.7	10.9	536.9	544.1
9:48:00	14.4	14.2	10.6	10.8	537.6	544.9
9:49:00	14.4	14.1	10.7	10.9	537.1	544.4
9:50:00	14.4	14.2	10.6	10.8	535.8	543.1
9:51:00	14.1	13.9	10.4	10.7	534.5	541.7
9:52:00	14.1	13.8	10.4	10.6	534.3	541.5
9:53:00	14.1	13.8	10.4	10.6	536.2	543.4
9:54:00	14.1	13.8	10.5	10.7	536.7	543.9
9:55:00	14.1	13.8	10.5	10.7	536.0	543.2
9:56:00	14.1	13.8	10.5	10.7	536.9	544.2
9:57:00	14.1	13.8	10.5	10.7	536.8	544.1
9:58:00	14.1	13.8	10.5	10.7	538.0	545.3
9:59:00	14.1	13.8	10.5	10.7	537.4	544.7
10:00:00	13.1	12.8	10.8	11.1	638.4	647.4
10:01:00	13.2	13.0	10.9	11.2	635.6	644.5
10:02:00	12.8	12.6	10.9	11.1	636.3	645.2
10:03:00	12.5	12.3	11.0	11.2	636.4	645.3
10:04:00	13.4	13.2	10.9	11.2	637.5	646.5
10:05:00	13.6	13.3	10.9	11.1	635.8	644.7
10:06:00	13.5	13.2	10.9	11.1	636.4	645.3
10:07:00	13.7	13.4	10.8	11.0	638.5	647.5
10:08:00	13.6	13.3	10.7	10.9	636.5	645.4
10:09:00	13.7	13.4	10.7	10.9	639.1	648.0
10:10:00	13.8	13.5	10.7	10.9	637.7	646.6
11:15:00	13.9	13.6	10.9	11.1	638.3	647.2
11:16:00	13.1	12.8	11.0	11.2	640.2	649.2
11:17:00	13.1	12.8	11.0	11.2	639.2	648.2
11:18:00	13.1	12.9	10.9	11.2	638.7	647.7
11:19:00	13.1	12.9	10.9	11.2	637.8	646.8
11:20:00	13.2	12.9	10.9	11.1	636.7	645.6
11:21:00	13.2	12.9	10.9	11.1	638.4	647.3

Test 3 **Kiln Stack**						
Date	6-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
11:22:00	13.3	13.0	10.8	11.0	637.4	646.4
11:23:00	13.2	13.0	10.9	11.1	638.2	647.2
11:24:00	13.2	13.0	10.8	11.1	637.6	646.6
11:25:00	13.1	12.8	10.9	11.2	638.7	647.7
11:26:00	13.1	12.9	10.9	11.1	638.6	647.6
11:27:00	13.0	12.8	11.0	11.2	638.1	647.0
11:28:00	13.1	12.8	10.9	11.2	439.1	444.7
11:29:00	13.1	12.9	10.9	11.1	439.7	445.3
11:30:00	13.2	12.9	10.9	11.1	439.1	444.8
11:31:00	13.3	13.1	10.8	11.0	419.0	424.2
11:32:00	13.5	13.2	10.7	10.9	421.6	427.0
11:33:00	13.5	13.2	10.7	10.9	414.6	419.8
11:34:00	13.4	13.2	10.7	10.9	420.5	425.8
11:35:00	13.4	13.1	10.8	11.0	418.7	424.0
11:36:00	13.5	13.2	10.7	10.9	421.3	426.6
11:37:00	13.6	13.3	10.6	10.8	419.7	425.0
11:38:00	13.5	13.2	10.7	10.9	421.9	427.2
11:39:00	13.7	13.4	10.5	10.7	418.4	423.6
11:40:00	13.6	13.3	10.6	10.8	420.6	425.9
11:41:00	13.7	13.4	10.5	10.7	419.2	424.5
11:42:00	13.8	13.5	10.4	10.6	419.8	425.1
11:43:00	13.9	13.6	10.4	10.6	420.3	425.6
11:44:00	13.8	13.6	10.3	10.5	420.1	425.4
11:45:00	13.3	13.0	10.1	10.3	419.7	425.0
11:46:00	13.6	13.3	10.0	10.2	420.4	425.7
11:47:00	13.7	13.4	9.9	10.1	420.1	425.4
11:48:00	13.6	13.4	9.9	10.1	419.3	424.6
11:49:00	13.6	13.4	9.9	10.1	417.6	422.8
11:50:00	13.6	13.3	9.9	10.1	419.9	425.1
11:51:00	13.6	13.4	9.9	10.1	418.4	423.6
11:52:00	13.6	13.4	9.9	10.1	419.6	424.9
11:53:00	13.6	13.4	9.9	10.1	419.7	425.0
11:54:00	13.6	13.3	10.0	10.2	417.5	422.8
11:55:00	13.6	13.3	10.0	10.1	417.9	423.2
11:56:00	13.6	13.3	10.0	10.2	416.5	421.8
11:57:00	13.6	13.3	9.9	10.1	418.1	423.4
11:58:00	13.6	13.4	9.9	10.1	418.5	423.8
11:59:00	13.5	13.3	10.0	10.2	418.7	424.0
12:00:00	13.6	13.3	10.0	10.2	569.9	577.7
12:01:00	13.5	13.2	10.0	10.2	571.0	578.8
12:02:00	13.5	13.2	10.0	10.2	568.1	575.9
12:03:00	13.6	13.3	10.0	10.2	567.0	574.7
12:04:00	13.6	13.3	10.0	10.2	566.3	574.1
12:05:00	13.6	13.3	10.0	10.2	567.9	575.7
12:06:00	13.5	13.3	10.0	10.2	567.8	575.5
12:07:00	13.5	13.2	10.0	10.2	567.3	575.1
12:08:00	13.5	13.2	10.0	10.2	569.7	577.4
12:09:00	13.5	13.3	10.0	10.2	568.1	575.9
12:10:00	13.5	13.2	10.0	10.2	567.9	575.7
12:11:00	13.5	13.2	10.0	10.2	568.0	575.8

Test 3 **Kiln Stack**						
Date	6-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
12:12:00	13.4	13.1	10.1	10.3	566.1	573.8
12:13:00	13.4	13.2	10.0	10.2	566.6	574.3
12:14:00	13.4	13.1	10.1	10.3	570.2	578.0
12:15:00	13.1	12.9	10.3	10.5	569.1	576.9
12:16:00	13.3	13.1	10.1	10.3	567.6	575.3
12:17:00	13.2	12.9	10.3	10.5	567.8	575.5
12:18:00	13.1	12.9	10.3	10.5	566.9	574.7
12:19:00	12.7	12.5	10.6	10.8	418.1	423.4
12:20:00	13.1	12.8	10.3	10.5	418.2	423.4
12:21:00	13.0	12.8	10.3	10.5	419.7	425.0
12:22:00	13.0	12.8	10.3	10.5	418.4	423.6
12:23:00	12.4	12.2	10.7	11.0	416.6	421.8
12:24:00	12.7	12.4	10.6	10.8	417.9	423.2
12:25:00	12.8	12.6	10.4	10.6	416.9	422.2
12:26:00	13.0	12.7	10.3	10.5	416.1	421.3
12:27:00	13.1	12.8	10.3	10.5	418.6	423.8
12:28:00	12.9	12.6	10.4	10.6	418.5	423.8
12:29:00	12.6	12.3	10.6	10.8	417.4	422.7
12:30:00	13.5	13.2	10.5	10.7	418.0	423.2
12:31:00	13.7	13.4	10.4	10.6	416.5	421.7
12:32:00	13.5	13.3	10.6	10.8	417.0	422.3
12:33:00	13.6	13.4	10.5	10.7	418.2	423.4
12:34:00	13.5	13.2	10.6	10.8	416.1	421.3
12:35:00	13.6	13.3	10.5	10.7	416.3	421.5
12:36:00	13.6	13.4	10.5	10.7	418.1	423.3
12:37:00	13.7	13.4	10.5	10.7	416.9	422.1
12:38:00	13.5	13.2	10.6	10.8	416.0	421.2
12:39:00	13.5	13.2	10.6	10.8	417.1	422.3
12:40:00	13.5	13.2	10.6	10.8	415.6	420.8
12:41:00	13.5	13.2	10.6	10.9	415.2	420.4
12:42:00	13.6	13.3	10.6	10.8	450.6	456.4
12:43:00	13.6	13.4	10.5	10.7	453.1	458.9
12:44:00	13.6	13.3	10.6	10.8	449.0	454.8
12:45:00	13.7	13.4	10.5	10.7	447.9	453.6
12:46:00	13.6	13.3	10.6	10.8	447.1	452.9
12:47:00	13.7	13.4	10.5	10.7	448.1	453.9
12:48:00	13.7	13.4	10.5	10.7	447.5	453.2
12:49:00	13.7	13.5	10.5	10.7	450.1	455.9
12:50:00	13.6	13.4	10.5	10.7	448.9	454.7
12:51:00	13.6	13.3	10.6	10.8	449.5	455.3
12:52:00	13.5	13.3	10.6	10.8	449.0	454.8
12:53:00	13.7	13.4	10.4	10.7	446.2	451.9
12:54:00	13.6	13.4	10.5	10.7	449.5	455.2
12:55:00	13.6	13.3	10.5	10.7	450.3	456.1
12:56:00	13.4	13.2	10.6	10.8	450.3	456.1
12:57:00	13.4	13.1	10.6	10.8	452.2	458.0
12:58:00	13.9	13.6	10.6	10.8	449.0	454.7
12:59:00	13.8	13.5	10.6	10.8	444.1	449.8
13:00:00	13.9	13.6	10.6	10.8	451.0	456.8
13:01:00	13.9	13.6	10.6	10.8	449.8	455.6

Test 3 **Kiln Stack**						
Date	6-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
13:02:00	13.8	13.5	10.6	10.8	448.8	454.5
13:03:00	14.0	13.8	10.4	10.7	448.1	453.9
13:04:00	13.9	13.6	10.6	10.8	401.9	406.9
13:05:00	13.9	13.6	10.6	10.8	402.5	407.5
13:06:00	13.8	13.6	10.6	10.8	302.9	306.2
13:07:00	13.8	13.5	10.6	10.8	306.1	309.5
13:08:00	13.8	13.5	10.6	10.8	309.1	312.5
13:09:00	13.7	13.4	10.7	10.9	313.5	317.0
13:10:00	13.6	13.3	10.8	11.0	315.7	319.2
13:11:00	13.6	13.3	10.8	11.0	322.8	326.5
13:12:00	13.6	13.3	10.8	11.0	325.7	329.4
13:13:00	13.5	13.3	10.8	11.0	329.7	333.5
13:14:00	13.6	13.4	10.7	10.9	330.8	334.6
13:15:00	13.8	13.5	10.6	10.8	333.3	337.2
13:16:00	13.8	13.5	10.6	10.8	331.5	335.3
13:17:00	13.7	13.4	10.7	10.9	244.0	246.4
13:18:00	13.9	13.6	10.6	10.8	242.3	244.6
13:19:00	14.1	13.8	10.4	10.6	241.4	243.7
13:20:00	14.0	13.7	10.5	10.7	246.7	249.1
13:21:00	14.0	13.7	10.5	10.7	239.5	241.7
16:19:00	13.8	13.5	10.6	10.8	239.3	241.5
16:20:00	13.9	13.7	10.5	10.7	241.3	243.6
16:21:00	14.1	13.8	10.3	10.5	241.0	243.3
16:22:00	14.1	13.8	10.4	10.6	239.8	242.0
16:23:00	13.9	13.6	10.5	10.8	238.3	240.5
16:24:00	13.7	13.4	10.7	10.9	235.2	237.4
16:25:00	13.9	13.6	10.5	10.7	238.7	241.0
16:26:00	14.0	13.8	10.4	10.6	238.3	240.6
16:27:00	13.8	13.6	10.5	10.7	242.6	244.9
16:28:00	13.9	13.6	10.5	10.7	239.8	242.1
16:29:00	14.0	13.8	10.4	10.6	239.1	241.4
16:30:00	14.0	13.7	10.5	10.7	239.7	242.0
16:31:00	13.9	13.6	10.5	10.7	240.1	242.3
16:32:00	14.0	13.7	10.4	10.6	240.8	243.1
16:33:00	14.1	13.9	10.3	10.5	241.3	243.6
16:34:00	14.1	13.8	10.3	10.5	236.9	239.1
16:35:00	13.9	13.7	10.4	10.7	238.0	240.3
16:36:00	13.8	13.5	10.6	10.8	238.7	241.0
16:37:00	13.9	13.6	10.5	10.7	238.5	240.8
16:38:00	14.1	13.8	10.3	10.5	236.8	239.0
16:39:00	14.1	13.8	10.4	10.6	240.1	242.4
16:40:00	13.7	13.5	10.6	10.8	239.2	241.5
16:41:00	13.8	13.6	10.5	10.8	237.8	240.1
16:42:00	13.9	13.6	10.5	10.7	197.3	198.9
16:43:00	14.1	13.8	10.4	10.6	193.3	194.8
16:44:00	14.1	13.8	10.4	10.6	193.0	194.5
16:45:00	14.2	13.9	10.3	10.5	196.5	198.0
16:46:00	14.0	13.7	10.4	10.6	197.4	199.0
16:47:00	14.0	13.8	10.4	10.6	198.7	200.3
16:48:00	14.2	13.9	10.3	10.5	196.9	198.5

Test 3 **Kiln Stack**						
Date	6-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
16:49:00	14.1	13.8	10.3	10.5	198.8	200.4
16:50:00	14.0	13.7	10.4	10.6	199.7	201.3
16:51:00	13.7	13.5	10.6	10.8	199.8	201.5
16:52:00	13.8	13.5	10.6	10.8	199.4	201.0
16:53:00	13.7	13.4	10.6	10.8	199.7	201.3
16:54:00	13.8	13.5	10.6	10.8	198.4	199.9
16:55:00	13.6	13.4	10.6	10.8	199.0	200.6
16:56:00	13.5	13.3	10.7	10.9	199.4	201.0
16:57:00	13.6	13.3	10.7	10.9	201.1	202.8
16:58:00	13.4	13.2	10.8	11.0	200.9	202.5
16:59:00	13.5	13.3	10.7	10.9	200.5	202.1
17:00:00	13.7	13.4	10.8	11.0	198.6	200.2
17:01:00	13.6	13.3	10.9	11.1	198.7	200.3
17:02:00	13.6	13.3	10.9	11.1	198.2	199.8
17:03:00	13.7	13.4	10.8	11.1	201.2	202.9
17:04:00	13.6	13.4	10.9	11.1	204.1	205.8
17:05:00	13.9	13.6	10.7	10.9	205.4	207.1
17:39:00	13.8	13.6	10.7	10.9	206.0	207.7
17:40:00	14.1	13.8	10.5	10.7	203.9	205.6
17:41:00	13.9	13.6	10.7	10.9	202.9	204.6
17:42:00	13.9	13.6	10.7	10.9	201.6	203.2
17:43:00	13.9	13.6	10.6	10.9	200.9	202.5
17:44:00	14.0	13.7	10.6	10.8	201.3	202.9
17:45:00	14.1	13.8	10.5	10.7	201.9	203.5
17:46:00	14.1	13.9	10.5	10.7	201.8	203.4
17:47:00	14.1	13.8	10.5	10.7	201.0	202.6
17:48:00	14.1	13.8	10.5	10.7	198.9	200.5
17:49:00	14.2	14.0	10.4	10.6	199.1	200.7
17:50:00	14.1	13.8	10.5	10.7	205.7	207.4
17:51:00	14.0	13.8	10.6	10.8	223.1	225.1
17:52:00	14.2	13.9	10.5	10.7	218.7	220.7
17:53:00	14.1	13.8	10.5	10.7	218.6	220.5
17:54:00	14.2	14.0	10.4	10.6	218.6	220.6
17:55:00	14.2	13.9	10.4	10.6	218.8	220.7
17:56:00	14.2	13.9	10.4	10.7	220.6	222.6
17:57:00	14.2	13.9	10.5	10.7	220.9	222.9
17:58:00	14.0	13.7	10.6	10.8	221.8	223.8
17:59:00	14.1	13.8	10.5	10.7	221.4	223.4
18:00:00	13.9	13.7	10.6	10.8	222.0	223.9
18:01:00	14.1	13.8	10.5	10.7	220.6	222.6
18:02:00	14.0	13.8	10.5	10.7	221.6	223.6
18:03:00	14.2	13.9	10.5	10.7	222.6	224.6
18:04:00	14.1	13.8	10.5	10.7	223.6	225.6
18:05:00	14.2	14.0	10.4	10.6	224.6	226.6
18:06:00	14.1	13.8	10.5	10.7	225.6	227.7
18:07:00	14.0	13.8	10.6	10.8	226.6	228.7
18:08:00	14.2	13.9	10.5	10.7	227.6	229.7
18:09:00	14.1	13.8	10.5	10.7	228.6	230.7
18:10:00	14.2	14.0	10.4	10.6	229.6	231.7

Test 3 **Kiln Stack**			
Date	6-Dec-18		
Analyzer	**O_2**	**CO_2**	**CO**
Low			

Summary of CEM Data

Kiln Stack, Baseline

O_2 (%)	CO (ppm)	CO_2 (%)
14.0	226.3	10.6

Test ID: Date: 7-Dec-18

Time	O_2 (%)	CO (ppm)	CO_2 (%)
8:24 to 12:32	13.6	235.5	10.6

Test ID: Date: 7-Dec-18

Time	O_2 (%)	CO (ppm)	CO_2 (%)
13:30 to 17:40	14.1	223.7	10.7

Test ID: Date: 8-Dec-18

Time	O_2 (%)	CO (ppm)	CO_2 (%)
7:56 to 12:15	14.2	219.6	10.6

Test 1 **Kiln Stack**						
Date	7-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
Zero Value *(Cv)*	0.0		0.0		0.0	
Direct *(C Dir)*	0		0		0	
Calibration Error *(ACE)*	0.00%	*PASS*	0.00%	*PASS*	0.00%	*PASS*
System Initial *(Csi)*	0.00		0.00		1.0	
System Post *(Csf)*	0.01		0.01		1.3	
Average *(Co)*	0.01		0.01		1.15	
System Bias Initial *(SBi)*	0.0%	*PASS*	0.0%	*PASS*	0.2%	*PASS*
System Bias Post *(SBf)*	0.0%	*PASS*	0.1%	*PASS*	0.3%	*PASS*
Drift Assessment *(D)*	0.05%	*PASS*	0.05%	*PASS*	0.06%	*PASS*
Mid						
Mid Value *(Cv)*	10.0		10.30		152.0	
Direct *(C Dir)*	10.0		10.3		152	
Calibration Error *(ACE)*	0.00%	*PASS*	0.00%	*PASS*	0.00%	*PASS*
System Initial *(Csi)*	9.95		10.3		153.3	
System Post *(Csf)*	9.9		10.1		154	
Average *(Cm)*	9.9		10.3		153.7	
System Bias Initial *(SBi)*	-0.2%	*PASS*	0.0%	*PASS*	0.3%	*PASS*
System Bias Post *(SBf)*	-0.5%	*PASS*	-1.0%	*PASS*	0.4%	*PASS*
Drift Assessment *(D)*	-0.24%	*PASS*	-1.00%	*PASS*	0.14%	*PASS*
High						
High Value *(CS/Cv)*	21.00		20.0		500.0	
Direct *(C Dir)*	20.85		20.1		498.0	
Calibration Error *(ACE)*	-0.71%	*PASS*	0.50%	*PASS*	-0.40%	*PASS*
System Initial *(Csi)*						
System Post *(Csf)*						
Average *(Cm)*	-		-		-	
System Bias Initial *(SBi)*	N/A	-	N/A	-	N/A	-
System Bias Post *(SBf)*	N/A	-	N/A	-	N/A	-
Drift Assessment *(D)*	N/A	-	N/A	-	N/A	-
Analyser Span (Range)	25		20		100	
Average	13.50	13.60	10.61	10.61	237.46	235.54
Time	**Recorded**	**Corrected**	**Recorded**	**Corrected**	**Recorded**	**Corrected**
8:24:00	13.3	13.4	11.5	11.5	225.6	223.7
8:25:00	13.3	13.4	10.3	10.3	221.5	219.6
8:26:00	13.3	13.4	10.3	10.3	205.2	203.4
8:27:00	13.3	13.4	10.3	10.3	208.7	206.8
8:28:00	13.2	13.3	10.4	10.4	210.1	208.3
8:29:00	13.2	13.3	10.4	10.4	227.1	225.2
8:30:00	13.2	13.3	10.4	10.4	229.5	227.6
8:31:00	13.2	13.3	10.4	10.4	214.2	212.3
8:32:00	13.1	13.2	10.4	10.4	216.8	215.0
8:33:00	13.1	13.2	10.5	10.5	202.2	200.4
8:34:00	13.0	13.1	10.5	10.5	196.7	194.9
8:35:00	13.1	13.2	10.5	10.5	213.3	211.5
8:36:00	13.0	13.1	10.6	10.6	224.1	222.2
8:37:00	13.1	13.2	10.5	10.5	226.3	224.4
8:38:00	13.0	13.1	10.6	10.6	214.9	213.0
8:39:00	13.0	13.1	10.5	10.5	209.6	207.8
8:40:00	13.0	13.1	10.5	10.5	212.9	211.0
8:41:00	13.0	13.1	10.5	10.5	210.6	208.8
8:42:00	13.0	13.1	10.6	10.6	211.7	209.8
8:43:00	13.0	13.1	10.5	10.5	228.7	226.8

Test 1 **Kiln Stack**						
Date	7-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
8:44:00	13.0	13.1	10.5	10.5	231.6	229.7
8:45:00	13.1	13.2	10.5	10.5	234.7	232.8
8:46:00	13.0	13.1	10.5	10.5	228.3	226.4
8:47:00	13.1	13.2	10.5	10.5	236.6	234.7
8:48:00	13.0	13.1	10.5	10.5	247.7	245.7
8:49:00	13.1	13.2	10.5	10.5	233.2	231.3
8:50:00	13.0	13.1	10.5	10.5	242.1	240.2
8:51:00	13.1	13.2	10.5	10.5	236.0	234.1
8:52:00	13.0	13.1	10.5	10.5	226.3	224.4
8:53:00	13.0	13.1	10.5	10.5	236.6	234.7
8:54:00	13.0	13.1	10.5	10.5	243.5	241.5
8:55:00	12.9	13.0	10.6	10.6	248.6	246.6
8:56:00	13.0	13.1	10.5	10.5	258.8	256.8
8:57:00	12.9	13.0	10.6	10.6	254.2	252.2
8:58:00	13.0	13.1	10.5	10.5	235.1	233.1
8:59:00	13.1	13.2	10.4	10.4	250.0	248.1
9:00:00	13.0	13.1	10.5	10.5	236.3	234.4
9:01:00	13.1	13.2	10.5	10.5	241.4	239.4
9:02:00	13.0	13.1	10.5	10.5	253.5	251.5
9:03:00	13.1	13.2	10.5	10.5	242.1	240.2
9:04:00	13.1	13.2	10.5	10.5	233.0	231.1
9:05:00	13.1	13.2	10.4	10.4	238.9	236.9
9:06:00	13.3	13.4	10.5	10.5	226.9	225.0
9:07:00	13.3	13.4	10.4	10.4	235.3	233.4
9:08:00	13.3	13.4	10.4	10.4	242.0	240.1
9:09:00	13.4	13.5	10.3	10.3	239.1	237.1
9:10:00	13.4	13.5	10.3	10.3	232.2	230.3
9:11:00	13.3	13.4	10.4	10.4	223.7	221.8
9:12:00	13.3	13.4	10.3	10.3	244.3	242.4
9:13:00	13.2	13.3	10.4	10.4	240.1	238.2
9:14:00	13.3	13.4	10.4	10.4	235.7	233.8
9:15:00	13.2	13.3	10.5	10.5	242.1	240.2
9:16:00	13.2	13.3	10.5	10.5	233.7	231.8
9:17:00	13.2	13.3	10.4	10.4	227.6	225.7
9:18:00	13.2	13.3	10.4	10.4	237.0	235.1
9:19:00	13.4	13.5	10.6	10.6	254.7	252.7
9:20:00	13.5	13.6	10.6	10.6	240.8	238.9
9:21:00	13.4	13.5	10.6	10.6	234.2	232.3
9:22:00	13.4	13.5	10.6	10.6	226.9	225.0
9:23:00	13.4	13.5	10.6	10.6	247.7	245.8
9:24:00	13.4	13.5	10.6	10.6	245.9	243.9
9:25:00	13.4	13.5	10.6	10.6	249.4	247.4
9:26:00	13.4	13.5	10.6	10.6	234.4	232.5
9:27:00	13.4	13.5	10.6	10.6	223.3	221.5
9:28:00	13.4	13.5	10.6	10.6	225.3	223.4
9:29:00	13.4	13.5	10.7	10.7	241.0	239.0
9:30:00	13.7	13.8	10.9	10.9	255.5	253.5
9:31:00	13.6	13.7	11.0	11.0	249.6	247.6
9:32:00	13.6	13.7	11.0	11.0	244.7	242.7
9:33:00	13.5	13.6	11.1	11.1	234.5	232.6

Test 1 **Kiln Stack**						
Date	7-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
9:34:00	13.6	13.7	11.0	11.0	240.1	238.2
9:35:00	13.6	13.7	11.0	11.0	232.9	231.0
9:36:00	13.7	13.8	10.9	10.9	248.2	246.2
9:37:00	13.7	13.8	10.9	10.9	254.0	252.0
9:38:00	13.7	13.8	10.9	10.9	254.3	252.3
9:39:00	13.6	13.7	11.0	11.0	241.9	240.0
9:40:00	13.7	13.8	11.0	11.0	231.9	230.0
9:41:00	13.7	13.8	10.9	10.9	233.7	231.8
9:42:00	13.7	13.8	11.0	11.0	235.8	233.9
9:43:00	13.6	13.7	11.0	11.0	221.0	219.2
9:44:00	13.7	13.8	10.9	10.9	226.6	224.7
9:45:00	13.7	13.8	10.9	10.9	232.2	230.3
9:46:00	13.7	13.8	10.9	10.9	206.0	204.1
9:47:00	13.7	13.8	10.9	10.9	203.3	201.5
9:48:00	13.6	13.7	11.0	11.0	223.8	221.9
9:49:00	13.6	13.7	11.0	11.0	219.4	217.5
9:50:00	13.6	13.7	11.0	11.0	216.7	214.8
9:51:00	13.6	13.7	11.0	11.0	211.0	209.1
9:52:00	13.6	13.7	11.0	11.0	216.5	214.6
9:53:00	13.6	13.7	11.0	11.0	214.2	212.3
9:54:00	13.6	13.7	11.0	11.0	225.3	223.4
9:55:00	13.6	13.7	10.9	10.9	211.7	209.8
9:56:00	13.6	13.7	10.9	10.9	240.0	238.0
9:57:00	13.7	13.8	10.9	10.9	216.4	214.6
9:58:00	13.6	13.7	10.9	10.9	197.2	195.4
9:59:00	13.6	13.7	10.9	10.9	203.3	201.5
10:00:00	13.6	13.7	10.9	10.9	211.3	209.5
10:01:00	13.6	13.7	10.9	10.9	241.2	239.2
10:02:00	13.6	13.7	10.9	10.9	230.1	228.2
10:03:00	13.6	13.7	10.8	10.8	229.0	227.1
10:04:00	13.7	13.8	10.8	10.8	205.6	203.8
10:05:00	13.7	13.8	10.8	10.8	199.5	197.7
10:06:00	13.6	13.7	10.8	10.8	212.2	210.4
10:07:00	13.7	13.8	10.8	10.8	224.3	222.4
10:08:00	13.7	13.8	10.8	10.8	222.0	220.1
10:09:00	13.7	13.8	10.7	10.7	221.9	220.0
10:10:00	14.1	14.2	11.0	11.0	213.9	212.1
10:11:00	14.0	14.1	11.0	11.0	217.0	215.2
10:12:00	14.0	14.1	11.0	11.0	220.4	218.6
10:13:00	14.1	14.2	10.9	10.9	242.9	241.0
10:14:00	14.1	14.2	10.9	10.9	225.0	223.1
10:15:00	14.2	14.3	10.9	10.9	255.1	253.1
10:16:00	14.1	14.2	10.9	10.9	263.9	261.9
10:17:00	14.1	14.2	10.9	10.9	221.5	219.7
10:18:00	14.0	14.2	10.9	10.9	216.2	214.4
10:19:00	14.0	14.1	11.0	11.0	227.6	225.8
10:20:00	13.9	14.1	11.0	11.0	224.7	222.8
10:21:00	13.8	13.9	10.9	10.9	229.9	228.0
10:22:00	13.8	13.9	10.8	10.8	224.6	222.7
10:23:00	13.9	14.0	10.8	10.8	218.5	216.7

Test 1 **Kiln Stack**						
Date	7-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
10:24:00	13.9	14.0	10.8	10.8	219.4	217.5
10:25:00	13.8	13.9	10.8	10.8	228.2	226.3
10:26:00	13.8	13.9	10.8	10.8	224.6	222.7
10:27:00	13.8	13.9	10.9	10.9	239.8	237.9
10:28:00	13.8	13.9	10.9	10.9	228.5	226.6
10:29:00	13.8	13.9	10.9	10.9	199.5	197.7
10:30:00	13.9	14.0	10.8	10.8	202.9	201.1
10:31:00	13.8	13.9	10.8	10.8	205.1	203.3
10:32:00	13.8	13.9	10.9	10.9	232.6	230.7
10:33:00	13.8	13.9	10.9	10.9	231.0	229.1
10:34:00	13.8	14.0	10.8	10.8	222.2	220.3
10:35:00	13.7	13.8	10.9	10.9	212.1	210.2
10:36:00	13.8	13.9	10.9	10.9	193.3	191.5
10:37:00	13.8	13.9	10.9	10.9	210.2	208.3
10:38:00	13.7	13.8	11.0	11.0	212.2	210.4
10:39:00	13.7	13.8	11.0	11.0	213.8	212.0
10:40:00	13.6	13.7	11.1	11.1	224.4	222.6
10:41:00	13.7	13.8	11.1	11.1	217.8	215.9
10:42:00	13.7	13.8	11.1	11.1	206.4	204.6
10:43:00	13.5	13.6	11.0	11.0	196.4	194.7
10:44:00	13.6	13.7	10.9	10.9	230.9	229.0
10:45:00	13.5	13.6	11.0	11.0	216.3	214.5
10:46:00	13.5	13.6	11.0	11.0	215.4	213.6
10:47:00	13.5	13.6	11.0	11.0	223.5	221.6
10:48:00	13.6	13.7	11.0	11.0	234.1	232.2
10:49:00	13.6	13.7	10.9	10.9	204.9	203.1
10:50:00	13.7	13.8	10.9	10.9	201.3	199.5
10:51:00	13.6	13.7	10.9	10.9	205.9	204.1
10:52:00	13.6	13.7	10.9	10.9	227.6	225.7
10:53:00	13.6	13.7	10.9	10.9	202.2	200.4
10:54:00	13.6	13.8	10.9	10.9	228.7	226.8
10:55:00	13.6	13.7	10.9	10.9	244.1	242.2
10:56:00	13.5	13.6	11.0	11.0	247.5	245.5
10:57:00	13.6	13.7	10.9	10.9	255.9	253.9
10:58:00	13.6	13.7	10.9	10.9	263.4	261.4
10:59:00	13.6	13.7	10.9	10.9	251.8	249.8
11:00:00	13.6	13.7	10.9	10.9	238.8	236.9
11:01:00	13.5	13.6	11.0	11.0	230.0	228.1
11:02:00	13.5	13.6	10.9	10.9	232.0	230.0
11:03:00	13.5	13.6	10.9	10.9	244.1	242.2
11:04:00	13.5	13.6	10.9	10.9	250.2	248.2
11:05:00	13.5	13.6	10.9	10.9	264.9	262.9
11:06:00	13.5	13.6	10.9	10.9	244.3	242.3
11:07:00	13.6	13.7	10.9	10.9	243.8	241.9
11:08:00	13.7	13.8	10.8	10.8	253.6	251.6
11:09:00	13.7	13.8	10.8	10.8	256.6	254.6
11:10:00	13.7	13.9	10.7	10.7	236.4	234.5
11:11:00	13.7	13.8	10.8	10.8	247.5	245.5
11:12:00	13.7	13.8	10.8	10.8	246.1	244.1
11:13:00	13.7	13.8	10.8	10.8	237.5	235.5

Test 1 **Kiln Stack**						
Date	7-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
11:14:00	13.3	13.4	10.4	10.4	244.4	242.5
11:15:00	13.4	13.5	10.3	10.3	247.7	245.8
11:16:00	13.4	13.5	10.3	10.3	264.2	262.1
11:17:00	13.4	13.5	10.3	10.3	244.8	242.8
11:18:00	13.4	13.5	10.3	10.3	240.8	238.9
11:19:00	13.4	13.5	10.3	10.3	228.6	226.7
11:20:00	13.4	13.5	10.3	10.3	240.6	238.7
11:21:00	13.5	13.6	10.2	10.2	254.7	252.7
11:22:00	13.4	13.5	10.3	10.3	254.3	252.3
11:23:00	13.3	13.4	10.3	10.3	245.9	244.0
11:24:00	13.4	13.5	10.3	10.3	243.9	242.0
11:25:00	13.4	13.5	10.3	10.3	229.9	228.0
11:26:00	13.5	13.6	10.2	10.2	228.5	226.6
11:27:00	13.5	13.6	10.2	10.2	223.3	221.4
11:28:00	13.4	13.5	10.3	10.3	242.1	240.1
11:29:00	13.4	13.6	10.2	10.2	244.4	242.5
11:30:00	13.4	13.6	10.2	10.2	227.7	225.8
11:31:00	13.5	13.6	10.2	10.2	227.7	225.8
11:32:00	13.5	13.6	10.2	10.2	227.8	225.9
11:33:00	13.5	13.6	10.2	10.2	227.7	225.8
11:34:00	13.5	13.6	10.2	10.2	227.2	225.3
11:35:00	13.5	13.6	10.2	10.2	227.0	225.1
11:36:00	13.4	13.5	10.2	10.2	227.8	225.9
11:37:00	13.5	13.6	10.2	10.2	227.7	225.8
11:38:00	13.5	13.6	10.2	10.2	227.7	225.8
11:39:00	13.6	13.7	10.1	10.1	227.7	225.8
11:40:00	13.6	13.7	10.1	10.1	227.7	225.9
11:41:00	13.6	13.7	10.1	10.1	227.7	225.8
11:42:00	13.6	13.7	10.1	10.1	227.1	225.2
11:43:00	13.5	13.6	10.2	10.2	227.7	225.9
11:44:00	13.5	13.6	10.2	10.2	227.3	225.4
11:45:00	13.5	13.6	10.2	10.2	227.8	225.9
11:46:00	13.5	13.6	10.2	10.2	227.7	225.8
11:47:00	13.5	13.6	10.2	10.2	227.7	225.8
11:48:00	13.5	13.6	10.2	10.2	227.7	225.8
11:49:00	13.5	13.6	10.2	10.2	227.7	225.8
11:50:00	13.5	13.6	10.2	10.2	227.9	226.0
11:51:00	13.5	13.6	10.2	10.2	227.1	225.2
11:52:00	13.4	13.5	10.3	10.3	241.0	239.0
11:53:00	13.4	13.5	10.3	10.3	240.9	239.0
11:54:00	13.5	13.6	10.5	10.5	251.4	249.4
11:55:00	13.6	13.7	10.4	10.4	261.8	259.8
11:56:00	13.5	13.6	10.5	10.5	272.2	270.2
11:57:00	13.4	13.5	10.6	10.6	243.7	241.7
11:58:00	13.5	13.6	10.5	10.5	254.1	252.1
11:59:00	13.5	13.6	10.5	10.5	264.6	262.6
12:00:00	13.5	13.6	10.4	10.4	265.6	263.6
12:01:00	13.5	13.6	10.4	10.4	266.6	264.5
12:02:00	13.6	13.7	10.4	10.4	267.6	265.5
12:03:00	13.6	13.7	10.4	10.4	268.6	266.5

Test 1 **Kiln Stack**						
Date	7-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
12:04:00	13.6	13.7	10.4	10.4	269.6	267.5
12:05:00	13.5	13.6	10.4	10.4	270.6	268.5
12:06:00	13.6	13.7	10.4	10.4	271.6	269.5
12:07:00	13.5	13.6	10.4	10.4	272.6	270.5
12:08:00	13.5	13.6	10.4	10.4	273.6	271.5
12:09:00	13.5	13.6	10.4	10.4	274.6	272.5
12:10:00	13.5	13.6	10.4	10.4	275.6	273.5
12:11:00	13.5	13.6	10.4	10.4	276.6	274.5
12:12:00	13.6	13.7	10.3	10.3	277.6	275.5
12:13:00	13.6	13.7	10.3	10.3	278.6	276.5
12:14:00	13.5	13.7	10.3	10.3	279.6	277.5
12:15:00	13.6	13.7	10.3	10.3	280.6	278.5
12:16:00	13.6	13.7	10.2	10.2	281.6	279.5
12:17:00	13.6	13.7	10.2	10.2	282.6	280.5
12:18:00	13.6	13.7	10.2	10.2	283.6	281.5
12:19:00	13.6	13.7	10.2	10.2	284.6	282.5
12:20:00	13.6	13.7	10.2	10.2	285.6	283.5
12:21:00	13.6	13.7	10.3	10.3	286.6	284.5
12:22:00	13.5	13.6	10.3	10.3	287.6	285.5
12:23:00	13.5	13.6	10.3	10.3	288.6	286.5
12:24:00	13.5	13.6	10.3	10.3	289.6	287.5
12:25:00	13.5	13.6	10.3	10.3	290.6	288.5
12:26:00	13.5	13.6	10.3	10.3	291.6	289.5
12:27:00	13.5	13.6	10.4	10.4	292.6	290.5
12:28:00	13.5	13.6	10.3	10.3	293.6	291.5
12:29:00	13.5	13.6	10.3	10.3	294.6	292.5
12:30:00	13.5	13.6	10.3	10.3	295.6	293.5
12:31:00	13.6	13.7	10.3	10.3	296.6	294.5
12:32:00	13.5	13.6	10.3	10.3	297.6	295.4

Test 2 **Kiln Stack**						
Date	7-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
Zero Value *(Cv)*	0.0		0.0		0.0	
Direct *(C Dir)*	0		0		0	
Calibration Error *(ACE)*	0.00%	*PASS*	0.00%	*PASS*	0.00%	*PASS*
System Initial *(Csi)*	0.01		0.00		1.1	
System Post *(Csf)*	0.01		0.02		2.3	
Average *(Co)*	0.01		0.01		1.70	
System Bias Initial *(SBi)*	0.0%	*PASS*	0.0%	*PASS*	0.2%	*PASS*
System Bias Post *(SBf)*	0.0%	*PASS*	0.1%	*PASS*	0.5%	*PASS*
Drift Assessment *(D)*	0.00%	*PASS*	0.10%	*PASS*	0.24%	*PASS*
Mid						
Mid Value *(Cv)*	10.0		10.30		152.0	
Direct *(C Dir)*	10.0		10.3		151.6	
Calibration Error *(ACE)*	0.00%	*PASS*	0.00%	*PASS*	-0.08%	*PASS*
System Initial *(Csi)*	9.9		10.31		151	
System Post *(Csf)*	10.1		10.33		153	
Average *(Cm)*	10.0		10.31		152.0	
System Bias Initial *(SBi)*	-0.5%	*PASS*	0.0%	*PASS*	-0.1%	*PASS*
System Bias Post *(SBf)*	0.5%	*PASS*	0.1%	*PASS*	0.3%	*PASS*
Drift Assessment *(D)*	0.95%	*PASS*	0.10%	*PASS*	0.40%	*PASS*
High						
High Value *(CS/Cv)*	21.00		20.0		500.0	
Direct *(C Dir)*	20.85		20.1		498.0	
Calibration Error *(ACE)*	-0.71%	*PASS*	0.50%	*PASS*	-0.40%	*PASS*
System Initial *(Csi)*						
System Post *(Csf)*						
Average *(Cm)*	-		-		-	
System Bias Initial *(SBi)*	N/A	-	N/A	-	N/A	-
System Bias Post *(SBf)*	N/A	-	N/A	-	N/A	-
Drift Assessment *(D)*	N/A	-	N/A	-	N/A	-
Analyser Span (Range)	25		20		100	
Average	14.06	14.07	10.67	10.66	222.90	223.70
Time	**Recorded**	**Corrected**	**Recorded**	**Corrected**	**Recorded**	**Corrected**
13:30:00	13.8	13.8	11.2	11.2	221.5	222.3
13:31:00	13.9	13.9	11.1	11.1	220.1	220.9
13:32:00	13.9	13.9	11.1	11.1	220.7	221.4
13:33:00	13.8	13.8	11.3	11.3	220.2	221.0
13:34:00	13.9	13.9	11.1	11.1	221.2	221.9
13:35:00	13.9	13.9	11.0	11.0	223.1	223.9
13:36:00	13.9	13.9	11.1	11.1	219.9	220.7
13:37:00	13.9	13.9	11.1	11.1	221.4	222.2
13:38:00	14.1	14.1	10.9	10.8	222.2	223.0
13:39:00	14.1	14.1	10.8	10.8	218.0	218.7
13:40:00	14.1	14.1	10.7	10.7	220.5	221.3
13:41:00	14.4	14.4	10.1	10.1	218.9	219.6
13:42:00	14.0	14.0	10.9	10.9	218.7	219.4
13:43:00	13.9	13.9	11.1	11.1	219.9	220.6
13:44:00	14.0	14.0	11.0	11.0	219.6	220.4
13:45:00	13.8	13.9	11.2	11.2	218.1	218.9
13:46:00	14.1	14.1	10.7	10.7	218.6	219.3
13:47:00	14.0	14.0	10.7	10.7	218.4	219.1
13:48:00	13.9	14.0	10.8	10.8	219.2	219.9
13:49:00	14.1	14.1	10.7	10.7	221.7	222.5

Test 2 Kiln Stack						
Date	7-Dec-18					
Analyzer	O_2		CO_2		CO	
Low						
13:50:00	13.8	13.8	11.3	11.3	225.5	226.4
13:51:00	14.2	14.2	10.7	10.7	222.5	223.3
13:52:00	13.9	13.9	11.1	11.1	236.8	237.8
13:53:00	14.0	14.0	10.7	10.7	238.6	239.6
13:54:00	14.2	14.2	10.3	10.3	237.5	238.5
13:55:00	14.0	14.0	10.8	10.8	236.6	237.6
13:56:00	13.9	13.9	11.1	11.1	239.9	240.9
13:57:00	13.9	13.9	11.0	11.0	238.6	239.6
13:58:00	13.8	13.8	11.2	11.2	238.6	239.5
13:59:00	13.8	13.8	11.2	11.2	237.1	238.0
14:00:00	13.9	13.9	11.0	11.0	239.2	240.2
14:01:00	13.9	13.9	11.1	11.1	237.9	238.9
14:02:00	14.1	14.1	10.7	10.7	235.4	236.3
14:03:00	13.8	13.8	11.1	11.1	235.5	236.5
14:04:00	14.1	14.1	10.7	10.7	235.5	236.4
14:05:00	14.0	14.0	10.9	10.9	235.9	236.8
14:06:00	14.0	14.0	11.0	11.0	237.2	238.2
14:07:00	13.8	13.8	11.2	11.2	236.0	236.9
14:08:00	14.1	14.1	10.7	10.6	236.7	237.7
14:09:00	14.1	14.1	10.9	10.9	236.9	237.9
14:10:00	13.9	13.9	11.3	11.3	237.6	238.6
14:11:00	13.9	13.9	11.0	11.0	237.1	238.1
14:12:00	13.9	13.9	11.1	11.1	235.8	236.8
14:13:00	13.9	13.9	11.0	11.0	234.5	235.4
14:14:00	14.0	14.0	10.9	10.9	234.3	235.3
14:15:00	13.8	13.8	11.2	11.2	236.2	237.2
14:16:00	13.8	13.8	11.4	11.4	236.7	237.6
14:17:00	14.0	14.0	10.9	10.9	236.0	237.0
14:18:00	14.0	14.0	10.9	10.9	236.9	237.9
14:19:00	13.9	13.9	11.1	11.1	236.8	237.8
14:20:00	13.9	13.9	11.1	11.1	238.0	239.0
14:21:00	13.7	13.7	11.5	11.4	237.4	238.4
14:22:00	13.9	13.9	11.0	11.0	238.4	239.4
14:23:00	13.9	13.9	11.0	11.0	235.6	236.5
14:24:00	13.9	13.9	11.0	11.0	236.3	237.3
14:25:00	13.9	13.9	11.1	11.1	236.4	237.4
14:26:00	13.9	13.9	10.9	10.9	237.5	238.5
14:27:00	14.0	14.0	11.0	10.9	235.8	236.7
14:28:00	13.9	13.9	11.1	11.1	236.4	237.3
14:29:00	14.0	14.0	10.8	10.8	238.5	239.5
14:30:00	13.9	13.9	11.0	11.0	236.5	237.4
14:31:00	14.1	14.1	10.7	10.7	239.1	240.1
14:32:00	14.1	14.1	10.6	10.6	237.7	238.6
14:33:00	14.0	14.0	10.9	10.9	238.3	239.3
14:34:00	14.1	14.1	10.7	10.7	240.2	241.2
14:35:00	14.0	14.0	11.1	11.0	239.2	240.2
14:36:00	14.0	14.0	10.9	10.9	238.7	239.7
14:37:00	14.0	14.0	10.9	10.9	237.8	238.8
14:38:00	14.0	14.0	11.0	10.9	236.7	237.6
14:39:00	14.0	14.0	10.8	10.8	238.4	239.4

Test 2 **Kiln Stack**						
Date	7-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
14:40:00	14.0	14.0	10.9	10.9	237.4	238.4
14:41:00	14.2	14.2	10.7	10.7	238.2	239.2
14:42:00	13.9	13.9	11.0	11.0	237.6	238.6
14:43:00	13.8	13.8	11.3	11.3	238.7	239.7
14:44:00	14.0	14.0	11.2	11.2	238.6	239.6
14:45:00	14.0	14.0	11.3	11.3	238.1	239.0
14:46:00	13.9	13.9	11.3	11.3	239.1	240.1
14:47:00	13.8	13.8	11.6	11.6	239.7	240.6
14:48:00	13.8	13.8	11.5	11.5	239.1	240.1
14:49:00	14.1	14.1	11.1	11.1	219.0	219.7
14:50:00	14.1	14.1	11.0	11.0	221.6	222.4
14:51:00	14.1	14.1	10.8	10.8	214.6	215.3
14:52:00	14.0	14.0	10.9	10.9	220.5	221.3
14:53:00	14.0	14.0	10.9	10.9	218.7	219.5
14:54:00	13.9	13.9	11.1	11.1	221.3	222.1
14:55:00	14.0	14.0	11.0	10.9	219.7	220.4
14:56:00	14.0	14.0	10.9	10.9	221.9	222.6
14:57:00	14.1	14.1	10.7	10.7	218.4	219.1
14:58:00	14.1	14.1	10.6	10.6	220.6	221.3
14:59:00	14.1	14.1	10.6	10.6	219.2	219.9
15:00:00	14.0	14.0	10.8	10.8	219.8	220.5
15:01:00	14.2	14.2	10.5	10.5	220.3	221.1
15:02:00	14.0	14.0	10.9	10.9	220.1	220.9
15:03:00	13.9	13.9	11.1	11.1	219.7	220.4
15:04:00	13.9	13.9	11.2	11.2	220.4	221.1
15:05:00	14.0	14.0	11.2	11.2	220.1	220.9
15:06:00	13.8	13.8	11.5	11.5	219.3	220.1
15:07:00	14.4	14.4	10.4	10.4	217.6	218.3
15:08:00	14.0	14.0	11.2	11.2	219.9	220.6
15:09:00	13.9	13.9	11.3	11.3	218.4	219.1
15:10:00	13.9	13.9	11.2	11.2	219.6	220.3
15:11:00	14.0	14.0	11.2	11.2	219.7	220.5
15:12:00	13.9	13.9	11.4	11.4	217.5	218.2
15:13:00	13.8	13.8	11.5	11.5	217.9	218.6
15:14:00	13.8	13.8	11.6	11.6	216.5	217.3
15:15:00	13.9	13.9	11.2	11.2	218.1	218.9
15:16:00	14.0	14.0	11.1	11.1	218.5	219.3
15:17:00	14.0	14.0	10.8	10.8	218.7	219.5
15:18:00	13.9	13.9	10.9	10.9	219.9	220.7
15:19:00	14.0	14.1	10.7	10.7	221.0	221.8
15:20:00	14.2	14.2	10.6	10.6	218.1	218.9
15:21:00	13.8	13.8	11.4	11.4	217.0	217.7
15:22:00	13.9	13.9	11.5	11.5	216.3	217.1
15:23:00	14.1	14.1	10.8	10.8	217.9	218.7
15:24:00	14.0	14.0	10.8	10.7	217.8	218.5
15:25:00	14.0	14.0	10.9	10.9	217.3	218.0
15:26:00	14.0	14.0	11.0	11.0	219.7	220.4
15:27:00	14.2	14.2	10.7	10.6	218.1	218.8
15:28:00	13.8	13.8	11.3	11.3	217.9	218.7
15:29:00	13.8	13.8	11.4	11.4	218.0	218.8

Test 2 **Kiln Stack**						
Date	7-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
15:30:00	13.5	13.5	11.8	11.8	216.1	216.8
15:31:00	13.9	13.9	11.4	11.4	216.6	217.3
15:32:00	13.9	13.9	11.1	11.1	220.2	221.0
15:33:00	14.0	14.0	11.0	11.0	219.1	219.9
15:34:00	13.9	13.9	11.1	11.1	217.6	218.3
15:35:00	14.0	14.0	11.0	11.0	217.8	218.5
15:36:00	14.1	14.1	10.8	10.7	216.9	217.6
15:37:00	14.1	14.1	10.8	10.8	218.1	218.8
15:38:00	14.0	14.0	11.0	11.0	218.2	218.9
15:39:00	14.0	14.0	10.7	10.7	219.7	220.5
15:40:00	14.1	14.1	10.5	10.5	218.4	219.1
15:41:00	14.0	14.0	10.5	10.4	216.6	217.3
15:42:00	14.0	14.0	10.4	10.3	217.9	218.7
15:43:00	14.0	14.0	10.5	10.5	216.9	217.7
15:44:00	13.9	13.9	10.7	10.7	216.1	216.8
15:45:00	13.9	13.9	11.1	11.0	218.6	219.3
15:46:00	13.8	13.8	11.3	11.3	218.5	219.2
15:47:00	13.9	13.9	11.4	11.4	217.4	218.2
15:48:00	13.9	13.9	11.5	11.5	218.0	218.7
15:49:00	13.7	13.8	11.7	11.7	216.5	217.2
15:50:00	13.9	13.9	11.5	11.5	217.0	217.8
15:51:00	13.9	13.9	11.5	11.4	218.2	218.9
15:52:00	13.8	13.8	11.6	11.6	216.1	216.8
15:53:00	13.9	13.9	11.4	11.4	216.3	217.0
15:54:00	13.8	13.8	11.3	11.3	218.1	218.8
15:55:00	14.0	14.0	11.0	11.0	216.9	217.6
15:56:00	14.0	14.0	11.0	11.0	216.0	216.7
15:57:00	13.8	13.8	11.1	11.1	217.1	217.8
15:58:00	13.8	13.8	11.2	11.2	215.6	216.3
15:59:00	13.9	13.9	11.2	11.1	215.2	215.9
16:00:00	13.8	13.8	11.3	11.3	250.6	251.7
16:01:00	13.7	13.7	11.6	11.6	253.1	254.2
16:02:00	13.7	13.7	11.7	11.6	249.0	250.1
16:03:00	13.8	13.8	11.5	11.5	247.9	249.0
16:04:00	13.9	13.9	11.3	11.3	247.1	248.2
16:05:00	13.8	13.8	11.4	11.4	248.1	249.2
16:06:00	13.8	13.8	11.3	11.3	247.5	248.6
16:07:00	13.9	13.9	11.2	11.2	250.1	251.2
16:08:00	14.0	14.0	11.1	11.1	248.9	250.0
16:09:00	13.9	13.9	11.3	11.2	249.5	250.6
16:10:00	14.0	14.0	11.0	11.0	249.0	250.1
16:11:00	13.8	13.8	11.2	11.2	246.2	247.3
16:12:00	13.9	13.9	11.4	11.3	249.5	250.6
16:13:00	13.9	13.9	11.3	11.3	250.3	251.4
16:14:00	14.2	14.2	10.8	10.8	250.3	251.4
16:15:00	13.9	13.9	11.2	11.2	252.2	253.3
16:16:00	13.9	13.9	11.3	11.3	249.0	250.1
16:17:00	13.9	13.9	11.2	11.2	244.1	245.1
16:18:00	13.9	13.9	11.2	11.2	251.0	252.1
16:19:00	13.8	13.8	11.2	11.2	249.8	250.9

Test 2 **Kiln Stack**						
Date	7-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
16:20:00	13.8	13.9	11.3	11.3	248.8	249.9
16:21:00	13.8	13.8	11.2	11.2	248.1	249.2
16:22:00	15.9	15.9	9.5	9.5	201.9	202.4
16:23:00	14.5	14.5	9.9	9.9	202.5	203.1
16:24:00	14.3	14.3	9.8	9.8	202.9	203.4
16:25:00	14.3	14.3	10.0	10.0	206.1	206.8
16:26:00	14.1	14.1	10.1	10.1	209.1	209.7
16:27:00	14.1	14.1	10.0	10.0	213.5	214.2
16:28:00	14.2	14.2	9.8	9.8	215.7	216.4
16:29:00	14.3	14.3	9.5	9.5	222.8	223.6
16:30:00	14.4	14.4	9.6	9.6	225.7	226.5
16:31:00	14.3	14.3	9.8	9.8	229.7	230.6
16:32:00	14.2	14.2	9.6	9.6	230.8	231.7
16:33:00	14.3	14.3	9.2	9.2	233.3	234.2
16:34:00	14.5	14.5	9.4	9.4	231.5	232.4
16:35:00	14.5	14.5	9.3	9.3	235.0	236.0
16:36:00	14.5	14.5	9.4	9.4	233.3	234.2
16:37:00	14.5	14.5	10.0	10.0	232.4	233.3
16:38:00	14.1	14.1	10.2	10.2	237.7	238.7
16:39:00	14.0	14.1	9.8	9.8	230.5	231.4
16:40:00	14.4	14.4	9.8	9.8	230.3	231.1
16:41:00	14.4	14.4	9.9	9.9	232.3	233.2
16:42:00	14.3	14.3	10.1	10.1	232.0	232.9
16:43:00	14.3	14.3	10.1	10.1	230.8	231.7
16:44:00	14.3	14.3	9.8	9.8	229.3	230.1
16:45:00	14.4	14.4	9.9	9.9	226.2	227.0
16:46:00	14.3	14.3	9.9	9.9	229.7	230.6
16:47:00	14.3	14.3	10.1	10.0	229.3	230.2
16:48:00	14.1	14.1	10.0	10.0	233.6	234.5
16:49:00	14.3	14.3	9.9	9.9	230.8	231.7
16:50:00	14.3	14.3	9.8	9.8	230.1	231.0
16:51:00	14.3	14.3	9.8	9.8	230.7	231.6
16:52:00	14.3	14.3	9.8	9.8	231.1	231.9
16:53:00	14.3	14.3	9.8	9.8	231.8	232.7
16:54:00	14.4	14.4	9.8	9.8	232.3	233.2
16:55:00	14.3	14.3	9.6	9.6	227.9	228.7
16:56:00	14.5	14.5	9.6	9.6	229.0	229.9
16:57:00	14.6	14.6	10.0	10.0	229.7	230.6
16:58:00	14.2	14.2	9.8	9.7	229.5	230.4
16:59:00	14.4	14.4	9.9	9.9	227.8	228.6
17:00:00	14.3	14.3	10.0	10.0	231.1	232.0
17:01:00	14.2	14.2	9.8	9.7	230.2	231.1
17:02:00	14.4	14.4	9.9	9.9	228.8	229.7
17:03:00	14.3	14.3	10.1	10.1	188.3	188.7
17:04:00	14.2	14.2	9.8	9.8	184.3	184.6
17:05:00	14.4	14.4	10.0	10.0	184.0	184.4
17:06:00	14.3	14.3	10.4	10.4	187.5	187.9
17:07:00	14.1	14.1	10.5	10.5	188.4	188.9
17:08:00	14.1	14.1	10.5	10.5	189.7	190.1
17:09:00	14.0	14.0	10.0	10.0	187.9	188.4

Test 2 **Kiln Stack**						
Date	7-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
17:10:00	14.3	14.3	10.2	10.2	189.8	190.2
17:11:00	14.2	14.2	10.1	10.1	190.7	191.1
17:12:00	14.3	14.3	9.9	9.9	190.8	191.3
17:13:00	14.4	14.4	9.9	9.9	190.4	190.8
17:14:00	14.3	14.3	10.3	10.3	190.7	191.1
17:15:00	14.1	14.1	10.0	10.0	189.4	189.8
17:16:00	14.3	14.3	9.9	9.9	190.0	190.5
17:17:00	14.3	14.3	9.7	9.7	190.4	190.8
17:18:00	14.5	14.5	9.9	9.9	192.1	192.6
17:19:00	14.4	14.4	9.5	9.5	191.9	192.3
17:20:00	14.5	14.5	9.5	9.5	191.5	191.9
17:21:00	14.5	14.5	9.7	9.7	189.6	190.0
17:22:00	14.4	14.4	10.0	10.0	189.7	190.1
17:23:00	14.3	14.3	10.1	10.1	189.2	189.6
17:24:00	14.2	14.2	10.0	10.0	192.2	192.7
17:25:00	14.2	14.2	10.0	10.0	195.1	195.6
17:26:00	14.2	14.2	9.9	9.9	196.4	196.9
17:27:00	14.3	14.3	9.5	9.5	197.0	197.5
17:28:00	14.4	14.4	9.8	9.8	194.9	195.4
17:29:00	14.3	14.3	9.7	9.7	193.9	194.4
17:30:00	14.3	14.3	9.4	9.4	192.6	193.0
17:31:00	14.4	14.4	9.3	9.3	191.9	192.3
17:32:00	14.5	14.5	9.4	9.4	192.3	192.7
17:33:00	14.5	14.5	9.6	9.6	192.9	193.3
17:34:00	14.3	14.3	10.2	10.2	192.8	193.2
17:35:00	14.1	14.2	10.1	10.1	192.0	192.5
17:36:00	14.3	14.3	9.8	9.8	189.9	190.4
17:37:00	14.3	14.3	9.9	9.9	190.1	190.5
17:38:00	14.3	14.3	9.9	9.9	196.7	197.2
17:39:00	14.2	14.3	10.0	10.0	214.1	214.8
17:40:00	14.2	14.2	9.8	9.8	209.7	210.4

Test 3 **Kiln Stack**						
Date	8-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
Zero Value *(Cv)*	0.0		0.0		0.0	
Direct *(C Dir)*	0		0		0	
Calibration Error *(ACE)*	0.00%	*PASS*	0.00%	*PASS*	0.00%	*PASS*
System Initial *(Csi)*	0.02		0.03		1.5	
System Post *(Csf)*	0.01		0.04		1.9	
Average *(Co)*	0.02		0.04		1.70	
System Bias Initial *(SBi)*	0.1%	*PASS*	0.2%	*PASS*	0.3%	*PASS*
System Bias Post *(SBf)*	0.0%	*PASS*	0.2%	*PASS*	0.4%	*PASS*
Drift Assessment *(D)*	-0.05%	*PASS*	0.05%	*PASS*	0.08%	*PASS*
Mid						
Mid Value *(Cv)*	10.0		10.30		152.0	
Direct *(C Dir)*	10.0		10.3		151.6	
Calibration Error *(ACE)*	0.00%	*PASS*	0.00%	*PASS*	-0.08%	*PASS*
System Initial *(Csi)*	10.2		10.3		154	
System Post *(Csf)*	10		10.1		155	
Average *(Cm)*	10.1		10.3		154.5	
System Bias Initial *(SBi)*	1.0%	*PASS*	0.0%	*PASS*	0.5%	*PASS*
System Bias Post *(SBf)*	0.0%	*PASS*	-1.0%	*PASS*	0.7%	*PASS*
Drift Assessment *(D)*	-0.95%	*PASS*	-1.00%	*PASS*	0.20%	*PASS*
High						
High Value *(CS/Cv)*	21.00		20.0		500.0	
Direct *(C Dir)*	20.85		20.1		498.0	
Calibration Error *(ACE)*	-0.71%	*PASS*	0.50%	*PASS*	-0.40%	*PASS*
System Initial *(Csi)*						
System Post *(Csf)*						
Average *(Cm)*	-		-		-	
System Bias Initial *(SBi)*	N/A	-	N/A	-	N/A	-
System Bias Post *(SBf)*	N/A	-	N/A	-	N/A	-
Drift Assessment *(D)*	N/A	-	N/A	-	N/A	-
Analyser Span (Range)	25		20		100	
Average	14.35	14.21	10.57	10.57	222.50	219.65
Time	**Recorded**	**Corrected**	**Recorded**	**Corrected**	**Recorded**	**Corrected**
7:56:00	14.1	14.0	11.0	11.0	221.5	218.6
7:57:00	14.1	13.9	11.0	11.0	220.1	217.3
7:58:00	14.1	13.9	11.0	11.0	220.7	217.8
7:59:00	14.0	13.9	11.0	11.0	220.2	217.3
8:00:00	14.1	13.9	11.0	11.0	221.2	218.3
8:01:00	14.1	14.0	10.9	10.9	223.1	220.2
8:02:00	14.1	14.0	10.9	10.9	219.9	217.1
8:03:00	14.2	14.0	10.9	10.9	221.4	218.5
8:04:00	14.1	14.0	10.9	10.9	222.2	219.4
8:05:00	14.0	13.9	10.9	10.9	218.0	215.1
8:06:00	14.0	13.9	11.0	11.0	220.5	217.7
8:07:00	14.0	13.9	11.0	11.0	218.9	216.0
8:08:00	13.9	13.8	11.1	11.1	218.7	215.8
8:09:00	14.0	13.9	11.0	11.0	219.9	217.0
8:10:00	13.9	13.8	11.0	11.0	219.6	216.8
8:11:00	14.0	13.9	11.0	11.0	218.1	215.3
8:12:00	14.0	13.8	11.0	11.0	218.6	215.7
8:13:00	14.0	13.9	11.0	11.0	218.4	215.5
8:14:00	14.0	13.9	11.0	11.0	219.2	216.3
8:15:00	13.9	13.8	11.0	11.0	221.7	218.9

Test 3 **Kiln Stack**						
Date	8-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
8:16:00	13.9	13.7	11.1	11.1	225.5	222.7
8:17:00	13.9	13.8	11.0	11.0	222.5	219.7
8:18:00	13.9	13.8	11.1	11.1	236.8	233.9
8:19:00	13.9	13.8	11.0	11.0	238.6	235.6
8:20:00	13.9	13.8	11.1	11.1	237.5	234.6
8:21:00	13.8	13.7	11.1	11.1	236.6	233.7
8:22:00	13.9	13.8	11.1	11.1	239.9	236.9
8:23:00	14.0	13.9	11.0	11.0	238.6	235.7
8:24:00	14.1	14.0	10.9	10.9	238.6	235.6
8:25:00	14.2	14.0	10.9	10.9	237.1	234.1
8:26:00	14.2	14.1	10.9	10.9	239.2	236.3
8:27:00	14.2	14.1	10.8	10.8	237.9	235.0
8:28:00	14.2	14.1	10.8	10.8	235.4	232.4
8:29:00	14.2	14.0	10.9	10.9	235.5	232.6
8:30:00	14.3	14.1	10.8	10.8	235.5	232.5
8:31:00	14.3	14.2	10.8	10.8	235.9	232.9
8:32:00	14.3	14.1	10.8	10.8	237.2	234.3
8:33:00	14.4	14.3	10.7	10.7	236.0	233.1
8:34:00	14.4	14.2	10.7	10.7	236.7	233.8
8:35:00	14.4	14.3	10.7	10.7	236.9	234.0
8:36:00	14.4	14.3	10.6	10.6	237.6	234.7
8:37:00	14.4	14.3	10.7	10.7	237.1	234.2
8:38:00	14.4	14.3	10.6	10.6	235.8	232.9
8:39:00	14.1	14.0	10.4	10.4	234.5	231.6
8:40:00	14.1	14.0	10.4	10.4	234.3	231.4
8:41:00	14.1	14.0	10.4	10.4	236.2	233.3
8:42:00	14.1	14.0	10.5	10.5	236.7	233.7
8:43:00	14.1	14.0	10.5	10.5	236.0	233.1
8:44:00	14.1	14.0	10.5	10.5	236.9	234.0
8:45:00	14.1	14.0	10.5	10.5	236.8	233.9
8:46:00	14.1	14.0	10.5	10.5	238.0	235.0
8:47:00	14.1	14.0	10.5	10.5	237.4	234.5
8:48:00	14.1	14.0	10.8	10.8	238.4	235.5
8:49:00	14.2	14.1	10.9	10.9	235.6	232.6
8:50:00	13.8	13.7	10.9	10.9	236.3	233.4
8:51:00	13.5	13.4	11.0	11.0	236.4	233.5
8:52:00	14.4	14.3	10.9	10.9	237.5	234.6
8:53:00	14.6	14.4	10.9	10.9	235.8	232.8
8:54:00	14.5	14.4	10.9	10.9	236.4	233.5
8:55:00	14.7	14.5	10.8	10.8	238.5	235.6
8:56:00	14.6	14.5	10.7	10.7	236.5	233.5
8:57:00	14.7	14.6	10.7	10.7	239.1	236.1
8:58:00	14.8	14.6	10.7	10.7	237.7	234.7
8:59:00	14.9	14.7	10.9	10.9	238.3	235.3
9:00:00	14.1	13.9	11.0	11.0	240.2	237.3
9:01:00	14.1	13.9	11.0	11.0	239.2	236.3
9:02:00	14.1	14.0	10.9	10.9	238.7	235.8
9:03:00	14.1	14.0	10.9	10.9	237.8	234.9
9:04:00	14.2	14.1	10.9	10.9	236.7	233.8
9:05:00	14.2	14.0	10.9	10.9	238.4	235.5

Test 3 **Kiln Stack**						
Date	8-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
9:06:00	14.3	14.1	10.8	10.8	237.4	234.5
9:07:00	14.2	14.1	10.9	10.9	238.2	235.3
9:08:00	14.2	14.1	10.8	10.8	237.6	234.7
9:09:00	14.1	14.0	10.9	10.9	238.7	235.8
9:10:00	14.1	14.0	10.9	10.9	238.6	235.7
9:11:00	14.0	13.9	11.0	11.0	238.1	235.1
9:12:00	14.1	14.0	10.9	10.9	239.1	236.2
9:13:00	14.1	14.0	10.9	10.9	239.7	236.7
9:14:00	14.2	14.0	10.9	10.9	239.1	236.2
9:15:00	14.3	14.2	10.8	10.8	219.0	216.1
9:16:00	14.5	14.3	10.7	10.7	221.6	218.8
9:17:00	14.5	14.4	10.7	10.7	214.6	211.8
9:18:00	14.4	14.3	10.7	10.7	220.5	217.7
9:19:00	14.4	14.2	10.8	10.8	218.7	215.9
9:20:00	14.5	14.4	10.7	10.7	221.3	218.4
9:21:00	14.6	14.4	10.6	10.6	219.7	216.8
9:22:00	14.5	14.4	10.7	10.7	221.9	219.0
9:23:00	14.7	14.5	10.5	10.5	218.4	215.5
9:24:00	14.6	14.5	10.6	10.6	220.6	217.7
9:25:00	14.7	14.6	10.5	10.5	219.2	216.3
9:26:00	14.8	14.6	10.4	10.4	219.8	216.9
9:27:00	14.9	14.7	10.4	10.4	220.3	217.4
9:28:00	14.8	14.7	10.3	10.3	220.1	217.2
9:29:00	14.3	14.2	10.1	10.1	219.7	216.8
9:30:00	14.6	14.4	10.0	10.0	220.4	217.5
9:31:00	14.7	14.5	9.9	9.9	220.1	217.3
9:32:00	14.6	14.5	9.9	9.9	219.3	216.5
9:33:00	14.6	14.5	9.9	9.9	217.6	214.7
9:34:00	14.6	14.5	9.9	9.9	219.9	217.0
9:35:00	14.6	14.5	9.9	9.9	218.4	215.5
9:36:00	14.6	14.5	9.9	9.9	219.6	216.7
9:37:00	14.6	14.5	9.9	9.9	219.7	216.9
9:38:00	14.6	14.4	10.0	10.0	217.5	214.7
9:39:00	14.6	14.5	10.0	10.0	217.9	215.1
9:40:00	14.6	14.4	10.0	10.0	216.5	213.7
9:41:00	14.6	14.5	9.9	9.9	218.1	215.3
9:42:00	14.6	14.5	9.9	9.9	218.5	215.7
9:43:00	14.5	14.4	10.0	10.0	218.7	215.9
9:44:00	14.6	14.4	10.0	10.0	219.9	217.1
9:45:00	14.5	14.4	10.0	10.0	221.0	218.1
9:46:00	14.5	14.4	10.0	10.0	218.1	215.3
9:47:00	14.6	14.4	10.0	10.0	217.0	214.2
9:48:00	14.6	14.4	10.0	10.0	216.3	213.5
9:49:00	14.6	14.4	10.0	10.0	217.9	215.1
9:50:00	14.5	14.4	10.0	10.0	217.8	214.9
9:51:00	14.5	14.4	10.0	10.0	217.3	214.5
9:52:00	14.5	14.4	10.0	10.0	219.7	216.8
9:53:00	14.5	14.4	10.0	10.0	218.1	215.3
9:54:00	14.5	14.4	10.0	10.0	217.9	215.1
9:55:00	14.5	14.3	10.0	10.0	218.0	215.2

Test 3 **Kiln Stack**						
Date	8-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
9:56:00	14.4	14.2	10.1	10.1	216.1	213.3
9:57:00	14.4	14.3	10.0	10.0	216.6	213.8
9:58:00	14.4	14.3	10.1	10.1	220.2	217.4
9:59:00	14.1	14.0	10.3	10.3	219.1	216.3
10:00:00	14.3	14.2	10.1	10.1	217.6	214.8
10:01:00	14.2	14.0	10.3	10.3	217.8	215.0
10:02:00	14.1	14.0	10.3	10.3	216.9	214.1
10:03:00	13.7	13.6	10.6	10.6	218.1	215.3
10:04:00	14.1	14.0	10.3	10.3	218.2	215.3
10:05:00	14.0	13.9	10.3	10.3	219.7	216.8
10:06:00	14.0	13.9	10.3	10.3	218.4	215.5
10:07:00	13.4	13.3	10.7	10.7	216.6	213.8
10:08:00	13.7	13.5	10.6	10.6	217.9	215.1
10:09:00	13.8	13.7	10.4	10.4	216.9	214.1
10:10:00	14.0	13.9	10.3	10.3	216.1	213.3
10:11:00	14.1	14.0	10.3	10.3	218.6	215.7
10:12:00	13.9	13.8	10.4	10.4	218.5	215.7
10:13:00	13.6	13.4	10.6	10.6	217.4	214.6
10:14:00	14.5	14.4	10.5	10.5	218.0	215.1
10:15:00	14.7	14.6	10.4	10.4	216.5	213.6
10:16:00	14.5	14.4	10.6	10.6	217.0	214.2
10:17:00	14.6	14.5	10.5	10.5	218.2	215.3
10:18:00	14.5	14.3	10.6	10.6	216.1	213.2
10:19:00	14.6	14.5	10.5	10.5	216.3	213.5
10:20:00	14.6	14.5	10.5	10.5	218.1	215.2
10:21:00	14.7	14.5	10.5	10.5	216.9	214.1
10:22:00	14.5	14.3	10.6	10.6	216.0	213.1
10:23:00	14.5	14.4	10.6	10.6	217.1	214.2
10:24:00	14.5	14.3	10.6	10.6	215.6	212.8
10:25:00	14.5	14.3	10.6	10.6	215.2	212.4
10:26:00	14.6	14.5	10.6	10.6	250.6	247.6
10:27:00	14.6	14.5	10.5	10.5	253.1	250.0
10:28:00	14.6	14.5	10.6	10.6	249.0	246.0
10:29:00	14.7	14.5	10.5	10.5	247.9	244.9
10:30:00	14.6	14.4	10.6	10.6	247.1	244.1
10:31:00	14.7	14.6	10.5	10.5	248.1	245.1
10:32:00	14.7	14.5	10.5	10.5	247.5	244.5
10:33:00	14.7	14.6	10.5	10.5	250.1	247.1
10:34:00	14.6	14.5	10.5	10.5	248.9	245.9
10:35:00	14.6	14.4	10.6	10.6	249.5	246.5
10:36:00	14.5	14.4	10.6	10.6	249.0	246.0
10:37:00	14.7	14.5	10.4	10.4	246.2	243.2
10:38:00	14.6	14.5	10.5	10.5	249.5	246.5
10:39:00	14.6	14.4	10.5	10.5	250.3	247.3
10:40:00	14.4	14.3	10.6	10.6	250.3	247.3
10:41:00	14.4	14.3	10.6	10.6	252.2	249.2
10:42:00	14.5	14.3	10.6	10.6	249.0	246.0
10:43:00	14.4	14.3	10.6	10.6	244.1	241.1
10:44:00	14.5	14.3	10.6	10.6	251.0	248.0
10:45:00	14.5	14.4	10.6	10.6	249.8	246.8

Test 3 **Kiln Stack**						
Date	8-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
10:46:00	14.4	14.3	10.6	10.6	248.8	245.8
10:47:00	14.6	14.5	10.4	10.4	248.1	245.1
10:48:00	14.5	14.4	10.6	10.6	201.9	199.1
10:49:00	14.5	14.3	10.6	10.6	202.5	199.7
10:50:00	14.4	14.3	10.6	10.6	202.9	200.1
10:51:00	14.4	14.3	10.6	10.6	206.1	203.4
10:52:00	14.4	14.3	10.6	10.6	209.1	206.3
10:53:00	14.3	14.1	10.7	10.7	213.5	210.7
10:54:00	14.2	14.1	10.8	10.8	215.7	212.9
10:55:00	14.2	14.0	10.8	10.8	222.8	219.9
10:56:00	14.2	14.1	10.8	10.8	225.7	222.8
10:57:00	14.1	14.0	10.8	10.8	229.7	226.8
10:58:00	14.2	14.1	10.7	10.7	230.8	227.9
10:59:00	14.4	14.2	10.6	10.6	233.3	230.4
11:00:00	14.4	14.3	10.6	10.6	231.5	228.6
11:01:00	14.3	14.2	10.7	10.7	235.0	232.1
11:02:00	14.5	14.3	10.6	10.6	233.3	230.4
11:03:00	14.7	14.5	10.4	10.4	232.4	229.5
11:04:00	14.6	14.4	10.5	10.5	237.7	234.8
11:05:00	14.6	14.4	10.5	10.5	230.5	227.6
11:06:00	14.4	14.3	10.6	10.6	230.3	227.4
11:07:00	14.5	14.4	10.5	10.5	232.3	229.4
11:08:00	14.7	14.6	10.3	10.3	232.0	229.1
11:09:00	14.7	14.5	10.4	10.4	230.8	227.9
11:10:00	14.5	14.3	10.5	10.5	229.3	226.4
11:11:00	14.3	14.1	10.7	10.7	226.2	223.3
11:12:00	14.5	14.4	10.5	10.5	229.7	226.8
11:13:00	14.6	14.5	10.4	10.4	229.3	226.4
11:14:00	14.4	14.3	10.5	10.5	233.6	230.6
11:15:00	14.5	14.4	10.5	10.5	230.8	227.9
11:16:00	14.6	14.5	10.4	10.4	230.1	227.2
11:17:00	14.6	14.4	10.5	10.5	230.7	227.8
11:18:00	14.5	14.4	10.5	10.5	231.1	228.2
11:19:00	14.6	14.4	10.4	10.4	231.8	228.9
11:20:00	14.7	14.6	10.3	10.3	232.3	229.4
11:21:00	14.7	14.6	10.3	10.3	227.9	225.0
11:22:00	14.5	14.4	10.4	10.4	229.0	226.1
11:23:00	14.4	14.3	10.6	10.6	229.7	226.8
11:24:00	14.5	14.3	10.5	10.5	229.5	226.7
11:25:00	14.7	14.6	10.3	10.3	227.8	224.9
11:26:00	14.7	14.5	10.4	10.4	231.1	228.2
11:27:00	14.3	14.2	10.6	10.6	230.2	227.3
11:28:00	14.4	14.3	10.5	10.5	228.8	225.9
11:29:00	14.5	14.4	10.5	10.5	188.3	185.6
11:30:00	14.7	14.5	10.4	10.4	184.3	181.6
11:31:00	14.7	14.5	10.4	10.4	184.0	181.3
11:32:00	14.8	14.7	10.3	10.3	187.5	184.8
11:33:00	14.6	14.5	10.4	10.4	188.4	185.8
11:34:00	14.6	14.5	10.4	10.4	189.7	187.0
11:35:00	14.8	14.6	10.3	10.3	187.9	185.3

Test 3 **Kiln Stack**						
Date	8-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
11:36:00	14.7	14.6	10.3	10.3	189.8	187.1
11:37:00	14.6	14.5	10.4	10.4	190.7	188.0
11:38:00	14.3	14.2	10.6	10.6	190.8	188.2
11:39:00	14.4	14.2	10.6	10.6	190.4	187.7
11:40:00	14.3	14.2	10.6	10.6	190.7	188.0
11:41:00	14.4	14.2	10.6	10.6	189.4	186.7
11:42:00	14.2	14.1	10.6	10.6	190.0	187.4
11:43:00	14.1	14.0	10.7	10.7	190.4	187.7
11:44:00	14.2	14.1	10.7	10.7	192.1	189.4
11:45:00	14.0	13.9	10.8	10.8	191.9	189.2
11:46:00	14.1	14.0	10.7	10.7	191.5	188.8
11:47:00	14.0	13.9	10.8	10.8	189.6	186.9
11:48:00	13.9	13.7	10.9	10.9	189.7	187.0
11:49:00	13.9	13.8	10.9	10.9	189.2	186.5
11:50:00	14.0	13.8	10.8	10.8	192.2	189.5
11:51:00	13.9	13.8	10.9	10.9	195.1	192.4
11:52:00	14.2	14.0	10.7	10.7	196.4	193.7
11:53:00	14.1	14.0	10.7	10.7	197.0	194.2
11:54:00	14.4	14.2	10.5	10.5	194.9	192.2
11:55:00	14.2	14.0	10.7	10.7	193.9	191.2
11:56:00	14.2	14.1	10.7	10.7	192.6	189.9
11:57:00	14.2	14.1	10.6	10.6	191.9	189.2
11:58:00	14.3	14.2	10.6	10.6	192.3	189.6
11:59:00	14.4	14.2	10.5	10.5	192.9	190.2
12:00:00	14.4	14.3	10.5	10.5	192.8	190.1
12:01:00	14.4	14.3	10.5	10.5	192.0	189.3
12:02:00	14.4	14.3	10.5	10.5	189.9	187.3
12:03:00	14.5	14.4	10.4	10.4	190.1	187.4
12:04:00	14.4	14.2	10.5	10.5	196.7	194.0
12:05:00	14.3	14.2	10.6	10.6	214.1	211.3
12:06:00	14.5	14.3	10.5	10.5	209.7	206.9
12:07:00	14.4	14.2	10.5	10.5	209.6	206.8
12:08:00	14.5	14.4	10.4	10.4	209.6	206.9
12:09:00	14.5	14.4	10.4	10.4	209.8	207.0
12:10:00	14.5	14.3	10.4	10.4	211.6	208.8
12:11:00	14.5	14.3	10.5	10.5	211.9	209.1
12:12:00	14.3	14.1	10.6	10.6	212.8	210.0
12:13:00	14.4	14.3	10.5	10.5	212.4	209.6
12:14:00	14.2	14.1	10.6	10.6	213.0	210.2
12:15:00	14.4	14.2	10.5	10.5	211.6	208.8

Summary of CEM Data

Kiln Stack, LCF

O_2 (%)	CO (ppm)	CO_2 (%)
13.3	306.0	10.9

Test ID: Date: 4-Dec-18

Time	O_2 (%)	CO (ppm)	CO_2 (%)
15:02 to 18:25	13.2	253.7	10.9

Test ID: Date: 5-Dec-18

Time	O_2 (%)	CO (ppm)	CO_2 (%)
9:06 to 13:30	13.3	264.8	11.0

Test ID: Date: 8-Dec-18

Time	O_2 (%)	CO (ppm)	CO_2 (%)
9:08 to 18:10	13.5	399.3	10.8

Test 1 **Kiln Stack**		
Date	4-Dec-18	
Analyzer	**Stack THC**	
Low		
Zero Value *(Cv)*	0.0	
Direct *(C Dir)*	0	
Calibration Error *(ACE)*	0.00%	*PASS*
System Initial *(Csi)*	0.60	
System Post *(Csf)*	0.30	
Average *(Co)*	0.45	
System Bias Initial *(SBi)*	0.1%	*PASS*
System Bias Post *(SBf)*	0.1%	*PASS*
Drift Assessment *(D)*	-0.06%	*PASS*
Mid		
Mid Value *(Cv)*	100.30	
Direct *(C Dir)*	100.6	
Calibration Error *(ACE)*	0.06%	*PASS*
System Initial *(Csi)*	101.1	
System Post *(Csf)*	103.2	
Average *(Cm)*	101.1	
System Bias Initial *(SBi)*	0.1%	*PASS*
System Bias Post *(SBf)*	0.5%	*PASS*
Drift Assessment *(D)*	0.42%	*PASS*
High		
High Value *(CS/Cv)*	501.0	
Direct *(C Dir)*	503.4	
Calibration Error *(ACE)*	0.48%	*PASS*
System Initial *(Csi)*		
System Post *(Csf)*		
Average *(Cm)*	-	
System Bias Initial *(SBi)*	N/A	-
System Bias Post *(SBf)*	N/A	-
Drift Assessment *(D)*	N/A	-
Analyser Span (Range)	300	
Average	143.54	142.59
Time	**Recorded**	**Corrected**
15:02:00	152.59	151.62
15:03:00	148.49	147.53
15:04:00	132.18	131.27
15:05:00	135.67	134.75
15:06:00	137.12	136.20
15:07:00	154.12	153.14
15:08:00	156.53	155.54
15:09:00	141.20	140.26
15:10:00	143.85	142.90
15:11:00	129.21	128.31
15:12:00	123.69	122.81
15:13:00	140.32	139.38
15:14:00	151.08	150.11

Test 1 **Kiln Stack**		
Date	4-Dec-18	
Analyzer	**Stack THC**	
Low		
15:15:00	153.31	152.33
15:16:00	141.87	140.93
15:17:00	136.64	135.71
15:18:00	139.86	138.93
15:19:00	137.63	136.71
15:20:00	138.68	137.75
15:21:00	155.66	154.67
15:22:00	158.64	157.64
15:23:00	161.69	160.68
15:24:00	155.30	154.31
15:25:00	163.63	162.61
15:26:00	174.68	173.62
15:27:00	160.23	159.23
15:28:00	169.10	168.07
15:29:00	163.03	162.02
15:30:00	153.29	152.31
15:31:00	163.65	162.63
15:32:00	170.46	169.42
15:33:00	145.55	144.60
15:34:00	155.76	154.77
15:35:00	151.18	150.20
15:36:00	132.05	131.14
15:37:00	147.02	146.06
15:38:00	133.32	132.41
15:39:00	138.36	137.43
15:40:00	150.51	149.54
15:41:00	139.14	138.20
15:42:00	129.97	129.07
15:43:00	135.86	134.94
15:44:00	123.90	123.02
15:45:00	132.27	131.37
15:46:00	139.01	138.08
15:47:00	136.06	135.13
15:48:00	129.16	128.26
15:49:00	120.73	119.86
15:50:00	141.35	140.41
15:51:00	137.10	136.18
15:52:00	132.73	131.82
15:53:00	139.10	138.17
15:54:00	130.71	129.81
15:55:00	124.55	123.67
15:56:00	134.02	133.11
15:57:00	151.70	150.72

Test 1 **Kiln Stack**		
Date	4-Dec-18	
Analyzer	**Stack THC**	
Low		
15:58:00	137.83	136.90
15:59:00	131.19	130.28
16:00:00	123.89	123.01
16:01:00	144.73	143.78
16:02:00	130.89	129.99
16:03:00	134.36	133.44
16:04:00	119.43	118.57
16:05:00	108.34	107.52
16:06:00	110.33	109.50
16:07:00	125.96	125.07
16:08:00	140.52	139.58
16:09:00	134.57	133.65
16:10:00	129.68	128.78
16:11:00	119.47	118.60
16:12:00	125.14	124.26
16:13:00	117.94	117.08
16:14:00	133.16	132.25
16:15:00	138.96	138.02
16:16:00	139.30	138.36
16:17:00	126.92	126.03
16:18:00	116.90	116.04
16:19:00	118.72	117.86
16:20:00	120.81	119.94
16:21:00	106.03	105.21
16:22:00	111.60	110.76
16:23:00	117.22	116.36
16:24:00	90.96	90.19
16:25:00	88.32	87.56
16:26:00	108.82	107.99
16:27:00	104.35	103.54
16:28:00	101.69	100.89
16:29:00	95.98	95.20
16:30:00	101.48	100.68
16:31:00	99.16	98.36
16:32:00	110.32	109.49
16:33:00	96.67	95.88
16:34:00	124.98	124.10
16:35:00	91.43	90.66
16:36:00	72.20	71.50
16:37:00	78.28	77.56
16:38:00	86.31	85.57
16:39:00	116.15	115.30
16:40:00	105.12	104.30

Test 1 **Kiln Stack**		
Date	4-Dec-18	
Analyzer	**Stack THC**	
Low		
16:41:00	104.03	103.22
16:42:00	80.60	79.87
16:43:00	74.46	73.75
16:44:00	87.19	86.44
16:45:00	99.28	98.49
16:46:00	97.00	96.21
16:47:00	96.92	96.13
16:48:00	88.94	88.19
16:49:00	92.02	91.25
16:50:00	95.43	94.65
16:51:00	117.93	117.07
16:52:00	99.96	99.16
16:53:00	130.05	129.15
16:54:00	138.90	137.97
16:55:00	96.53	95.75
16:56:00	91.22	90.46
16:57:00	102.65	101.84
16:58:00	99.71	98.92
16:59:00	104.87	104.06
17:00:00	99.62	98.82
17:01:00	93.54	92.77
17:02:00	94.37	93.59
17:03:00	103.17	102.37
17:04:00	99.60	98.81
17:05:00	114.82	113.97
17:06:00	103.46	102.65
17:07:00	74.55	73.84
17:08:00	77.92	77.20
17:09:00	80.12	79.39
17:10:00	107.57	106.74
17:11:00	105.97	105.16
17:12:00	97.20	96.41
17:13:00	87.06	86.30
17:14:00	68.31	67.62
17:15:00	85.16	84.41
17:16:00	87.20	86.44
17:17:00	88.85	88.09
17:18:00	99.44	98.65
17:19:00	92.80	92.03
17:20:00	81.42	80.69
17:21:00	71.44	70.75
17:22:00	105.86	105.05
17:23:00	91.33	90.56

Test 1 **Kiln Stack**		
Date	4-Dec-18	
Analyzer	**Stack THC**	
Low		
17:24:00	90.43	89.67
17:25:00	98.46	97.67
17:26:00	109.08	108.25
17:27:00	79.93	79.20
17:28:00	76.33	75.62
17:29:00	80.92	80.19
17:30:00	102.63	101.82
17:31:00	77.24	76.52
17:32:00	103.70	102.89
17:33:00	119.14	118.28
17:34:00	122.46	121.58
17:35:00	130.89	129.99
17:36:00	138.44	137.51
17:37:00	126.76	125.87
17:38:00	113.79	112.94
17:39:00	104.95	104.14
17:40:00	106.96	106.14
17:41:00	119.11	118.25
17:42:00	125.19	124.31
17:43:00	139.93	138.99
17:44:00	119.27	118.41
17:45:00	118.82	117.96
17:46:00	128.60	127.71
17:47:00	131.61	130.70
17:48:00	111.45	110.61
17:49:00	122.47	121.60
17:50:00	121.10	120.23
17:51:00	112.46	111.62
17:52:00	119.42	118.55
17:53:00	122.73	121.86
17:54:00	139.16	138.23
17:55:00	119.78	118.92
17:56:00	115.82	114.97
17:57:00	103.56	102.75
17:58:00	115.60	114.74
17:59:00	129.67	128.77
18:00:00	129.30	128.40
18:01:00	120.94	120.07
18:02:00	118.93	118.07
18:03:00	104.93	104.12
18:04:00	103.47	102.67
18:05:00	98.31	97.52
18:06:00	117.07	116.21

Test 1 **Kiln Stack**		
Date	4-Dec-18	
Analyzer	**Stack THC**	
Low		
18:07:00	119.43	118.57
18:08:00	101.71	100.91
18:09:00	102.69	101.88
18:10:00	101.81	101.01
18:11:00	102.73	101.93
18:12:00	106.18	105.36
18:13:00	112.00	111.16
18:14:00	102.78	101.98
18:15:00	106.67	105.85
18:16:00	108.00	107.18
18:17:00	102.68	101.87
18:18:00	105.00	104.19
18:19:00	111.00	110.17
18:20:00	108.50	107.67
18:21:00	105.30	104.49
18:22:00	102.28	101.48
18:23:00	112.00	111.16
18:24:00	103.30	102.49
18:25:00	99.50	98.71

Test 2
Kiln Stack

Date	5-Dec-18	
Analyzer	**Stack THC**	
Low		
Zero Value *(Cv)*	0.0	
Direct *(C Dir)*	0	
Calibration Error *(ACE)*	0.00%	*PASS*
System Initial *(Csi)*	0.10	
System Post *(Csf)*	0.30	
Average *(Co)*	0.20	
System Bias Initial *(SBi)*	0.0%	*PASS*
System Bias Post *(SBf)*	0.1%	*PASS*
Drift Assessment *(D)*	0.04%	*PASS*
Mid		
Mid Value *(Cv)*	100.30	
Direct *(C Dir)*	101.2	
Calibration Error *(ACE)*	0.18%	*PASS*
System Initial *(Csi)*	102.3	
System Post *(Csf)*	103.2	
Average *(Cm)*	102.3	
System Bias Initial *(SBi)*	0.2%	*PASS*
System Bias Post *(SBf)*	0.4%	*PASS*
Drift Assessment *(D)*	0.18%	*PASS*
High		
High Value *(CS/Cv)*	501.0	
Direct *(C Dir)*	502.6	
Calibration Error *(ACE)*	0.32%	*PASS*
System Initial *(Csi)*		
System Post *(Csf)*		
Average *(Cm)*	-	
System Bias Initial *(SBi)*	N/A	-
System Bias Post *(SBf)*	N/A	-
Drift Assessment *(D)*	N/A	-
Analyser Span (Range)	300	
Average	147.53	144.73
Time	**Recorded**	**Corrected**
9:05:00	161.47	158.43
9:06:00	160.12	157.10
9:07:00	160.66	157.63
9:08:00	160.19	157.17
9:09:00	161.16	158.13
9:10:00	163.07	160.00
9:11:00	159.92	156.91
9:12:00	161.39	158.35
9:13:00	162.23	159.18
9:14:00	157.97	154.99
9:15:00	160.54	157.51
9:16:00	158.86	155.86
9:17:00	158.66	155.66

Test 2
Kiln Stack

Date	5-Dec-18	
Analyzer	**Stack THC**	
Low		
9:18:00	159.87	156.85
9:19:00	159.63	156.62
9:20:00	158.15	155.16
9:21:00	158.56	155.57
9:22:00	158.37	155.38
9:23:00	159.16	156.16
9:24:00	161.74	158.69
9:25:00	165.55	162.43
9:26:00	162.53	159.47
9:27:00	176.80	173.48
9:28:00	178.59	175.24
9:29:00	177.50	174.17
9:30:00	176.63	173.32
9:31:00	179.90	176.53
9:32:00	178.64	175.29
9:33:00	178.56	175.22
9:34:00	177.07	173.76
9:35:00	179.21	175.86
9:36:00	177.89	174.55
9:37:00	175.36	172.07
9:38:00	175.54	172.24
9:39:00	165.50	162.39
9:40:00	150.85	148.00
9:41:00	152.25	149.37
9:42:00	150.98	148.12
9:43:00	151.70	148.83
9:44:00	151.89	149.02
9:45:00	152.62	149.73
9:46:00	152.12	149.24
9:47:00	150.82	147.96
9:48:00	149.48	146.65
9:49:00	149.32	146.49
9:50:00	151.21	148.34
9:51:00	151.67	148.80
9:52:00	151.00	148.14
9:53:00	151.91	149.04
9:54:00	151.80	148.93
9:55:00	152.99	150.09
9:56:00	152.44	149.56
9:57:00	153.43	150.52
9:58:00	150.55	147.70
9:59:00	151.33	148.46
10:00:00	151.40	148.53

Test 2
Kiln Stack

Date	5-Dec-18	
Analyzer	**Stack THC**	
Low		
10:01:00	152.54	149.65
10:02:00	150.76	147.90
10:03:00	151.38	148.52
10:04:00	153.53	150.63
10:05:00	151.46	148.59
10:06:00	154.07	151.16
10:07:00	152.67	149.78
10:08:00	153.28	150.38
10:09:00	155.23	152.30
10:10:00	154.22	151.30
10:11:00	153.74	150.83
10:12:00	152.82	149.93
10:13:00	151.69	148.82
10:14:00	153.40	150.49
10:15:00	152.44	149.55
10:16:00	153.23	150.33
10:17:00	152.65	149.76
10:18:00	153.72	150.81
10:19:00	153.63	150.72
10:20:00	153.05	150.16
10:21:00	154.10	151.19
10:22:00	154.65	151.73
10:23:00	154.14	151.23
10:24:00	133.97	131.41
10:25:00	136.63	134.03
10:26:00	129.62	127.14
10:27:00	135.51	132.92
10:28:00	128.74	126.28
10:29:00	131.30	128.79
10:30:00	129.67	127.18
10:31:00	131.86	129.34
10:32:00	128.37	125.91
10:33:00	130.56	128.06
10:34:00	129.17	126.70
10:35:00	129.78	127.29
10:36:00	130.29	127.80
10:37:00	130.08	127.59
10:38:00	129.66	127.18
10:39:00	130.36	127.87
10:40:00	130.14	127.65
10:41:00	129.29	126.82
10:42:00	127.56	125.11
10:43:00	129.85	127.37

Test 2
Kiln Stack

Date	5-Dec-18	
Analyzer	**Stack THC**	
Low		
10:44:00	128.38	125.92
10:45:00	129.57	127.09
10:46:00	129.70	127.21
10:47:00	127.51	125.06
10:48:00	127.90	125.44
10:49:00	126.55	124.12
10:50:00	128.11	125.65
10:51:00	128.53	126.06
10:52:00	128.74	126.27
10:53:00	129.90	127.41
10:54:00	130.98	128.47
10:55:00	128.12	125.67
10:56:00	126.99	124.55
10:57:00	126.35	123.92
10:58:00	127.91	125.45
10:59:00	127.76	125.31
11:00:00	127.30	124.86
11:01:00	129.65	127.17
11:02:00	128.10	125.64
11:03:00	127.91	125.46
11:04:00	128.04	125.59
11:05:00	126.11	123.69
11:06:00	126.60	124.17
11:07:00	130.23	127.74
11:08:00	139.12	136.47
11:09:00	137.58	134.96
11:10:00	137.78	135.16
11:11:00	136.91	134.30
11:12:00	138.09	135.46
11:13:00	138.18	135.54
11:14:00	139.69	137.03
11:15:00	138.37	135.74
11:16:00	136.60	134.00
11:17:00	137.95	135.32
11:18:00	136.92	134.31
11:19:00	136.07	133.48
11:20:00	138.55	135.91
11:21:00	138.49	135.85
11:22:00	137.44	134.82
11:23:00	137.96	135.33
11:24:00	136.47	133.87
11:25:00	137.02	134.41
11:26:00	148.18	145.37

Test 2
Kiln Stack

Date	5-Dec-18	
Analyzer	**Stack THC**	
Low		
11:27:00	146.05	143.28
11:28:00	146.28	143.50
11:29:00	148.05	145.24
11:30:00	146.88	144.09
11:31:00	145.96	143.19
11:32:00	147.05	144.26
11:33:00	145.63	142.86
11:34:00	145.22	142.46
11:35:00	155.60	152.66
11:36:00	158.06	155.08
11:37:00	154.00	151.08
11:38:00	152.88	149.99
11:39:00	152.11	149.24
11:40:00	153.10	150.20
11:41:00	152.48	149.60
11:42:00	155.06	152.13
11:43:00	153.90	150.99
11:44:00	154.53	151.61
11:45:00	154.02	151.11
11:46:00	151.20	148.34
11:47:00	154.46	151.54
11:48:00	155.27	152.34
11:49:00	155.31	152.38
11:50:00	157.18	154.21
11:51:00	153.96	151.05
11:52:00	149.10	146.28
11:53:00	155.99	153.05
11:54:00	179.77	176.40
11:55:00	178.77	175.42
11:56:00	178.12	174.78
11:57:00	131.87	129.35
11:58:00	132.50	129.97
11:59:00	125.87	123.46
12:00:00	129.14	126.67
12:01:00	132.10	129.57
12:02:00	136.49	133.89
12:03:00	138.67	136.03
12:04:00	145.80	143.04
12:05:00	148.70	145.89
12:06:00	152.72	149.83
12:07:00	153.80	150.89
12:08:00	156.31	153.36
12:09:00	154.46	151.54

Test 2
Kiln Stack

Date	5-Dec-18	
Analyzer	**Stack THC**	
Low		
12:10:00	158.04	155.05
12:11:00	156.28	153.33
12:12:00	155.39	152.45
12:13:00	160.74	157.71
12:14:00	153.46	150.56
12:15:00	153.26	150.36
12:16:00	155.32	152.38
12:17:00	155.02	152.09
12:18:00	153.76	150.86
12:19:00	152.28	149.39
12:20:00	149.18	146.36
12:21:00	152.74	149.85
12:22:00	152.30	149.42
12:23:00	156.56	153.61
12:24:00	153.80	150.89
12:25:00	153.14	150.25
12:26:00	153.74	150.84
12:27:00	154.05	151.14
12:28:00	154.82	151.89
12:29:00	155.33	152.40
12:30:00	150.89	148.03
12:31:00	152.03	149.16
12:32:00	152.71	149.82
12:33:00	152.54	149.66
12:34:00	150.77	147.92
12:35:00	154.11	151.19
12:36:00	153.18	150.28
12:37:00	151.81	148.94
12:38:00	111.32	109.16
12:39:00	107.28	105.19
12:40:00	107.00	104.91
12:41:00	110.49	108.34
12:42:00	111.44	109.28
12:43:00	112.66	110.48
12:44:00	110.94	108.79
12:45:00	112.78	110.59
12:46:00	113.69	111.49
12:47:00	113.85	111.65
12:48:00	113.40	111.21
12:49:00	113.66	111.46
12:50:00	112.36	110.18
12:51:00	113.05	110.86
12:52:00	113.41	111.22

Test 2
Kiln Stack

Date	5-Dec-18	
Analyzer	**Stack THC**	
Low		
12:53:00	115.14	112.91
12:54:00	114.88	112.66
12:55:00	114.49	112.27
12:56:00	112.58	110.40
12:57:00	112.70	110.52
12:58:00	112.20	110.03
12:59:00	115.23	113.00
13:00:00	118.08	115.80
13:01:00	119.41	117.11
13:02:00	119.97	117.65
13:03:00	117.94	115.66
13:04:00	116.90	114.64
13:05:00	115.57	113.34
13:06:00	114.86	112.64
13:07:00	115.26	113.03
13:08:00	115.87	113.63
13:09:00	115.75	113.51
13:10:00	115.00	112.77
13:11:00	112.94	110.75
13:12:00	113.05	110.86
13:13:00	119.69	117.39
13:14:00	137.14	134.53
13:15:00	132.73	130.20
13:16:00	133.73	131.18
13:17:00	134.73	132.16
13:18:00	135.73	133.14
13:19:00	136.73	134.13
13:20:00	137.73	135.11
13:21:00	138.73	136.09
13:22:00	139.73	137.07
13:23:00	140.73	138.06
13:24:00	141.73	139.04
13:25:00	142.73	140.02
13:26:00	143.73	141.00
13:27:00	144.73	141.99
13:28:00	145.73	142.97
13:29:00	146.73	143.95
13:30:00	147.73	144.93

Test 3 **Kiln Stack**						
Date	6-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
Zero Value *(Cv)*	0.0		0.0		0.0	
Direct *(C Dir)*	0		0		0	
Calibration Error *(ACE)*	0.00%	*PASS*	0.00%	*PASS*	0.00%	*PASS*
System Initial *(Csi)*	0.00		0.00		2.1	
System Post *(Csf)*	0.01		0.04		1.3	
Average *(Co)*	0.01		0.02		1.70	
System Bias Initial *(SBi)*	0.0%	*PASS*	0.0%	*PASS*	0.4%	*PASS*
System Bias Post *(SBf)*	0.0%	*PASS*	0.2%	*PASS*	0.3%	*PASS*
Drift Assessment *(D)*	0.05%	*PASS*	0.20%	*PASS*	-0.16%	*PASS*
Mid						
Mid Value *(Cv)*	10.0		10.30		152.0	
Direct *(C Dir)*	10.0		10.3		151.6	
Calibration Error *(ACE)*	0.00%	*PASS*	0.00%	*PASS*	-0.08%	*PASS*
System Initial *(Csi)*	10.1		10.1		151.5	
System Post *(Csf)*	10.3		10.2		150.9	
Average *(Cm)*	10.2		10.1		151.2	
System Bias Initial *(SBi)*	0.5%	*PASS*	-1.0%	*PASS*	0.0%	*PASS*
System Bias Post *(SBf)*	1.4%	*PASS*	-0.5%	*PASS*	-0.1%	*PASS*
Drift Assessment *(D)*	0.95%	*PASS*	0.50%	*PASS*	-0.12%	*PASS*
High						
High Value *(CS/Cv)*	21.00		20.0		500.0	
Direct *(C Dir)*	20.85		20.1		498.0	
Calibration Error *(ACE)*	-0.71%	*PASS*	0.50%	*PASS*	-0.40%	*PASS*
System Initial *(Csi)*						
System Post *(Csf)*						
Average *(Cm)*	-		-		-	
System Bias Initial *(SBi)*	N/A	-	N/A	-	N/A	-
System Bias Post *(SBf)*	N/A	-	N/A	-	N/A	-
Drift Assessment *(D)*	N/A	-	N/A	-	N/A	-
Analyser Span (Range)	25		20		100	
Average	13.74	13.47	10.57	10.78	394.45	399.31
Time	**Recorded**	**Corrected**	**Recorded**	**Corrected**	**Recorded**	**Corrected**
9:08:00	14.1	13.9	11.0	11.2	421.5	426.8
9:09:00	14.1	13.8	11.0	11.2	420.1	425.4
9:10:00	14.1	13.8	11.0	11.2	420.7	426.0
9:11:00	14.0	13.8	11.0	11.2	420.2	425.5
9:12:00	14.1	13.8	11.0	11.2	421.2	426.5
9:13:00	14.1	13.8	10.9	11.2	423.1	428.4
9:14:00	14.1	13.9	10.9	11.1	419.9	425.2
9:15:00	14.2	13.9	10.9	11.1	421.4	426.7
9:16:00	14.1	13.8	10.9	11.1	422.2	427.6
9:17:00	14.0	13.8	10.9	11.2	418.0	423.2
9:18:00	14.0	13.8	11.0	11.2	420.5	425.8
9:19:00	14.0	13.7	11.0	11.2	418.9	424.1
9:20:00	13.9	13.7	11.1	11.3	418.7	423.9
9:21:00	14.0	13.8	11.0	11.2	419.9	425.2
9:22:00	13.9	13.7	11.0	11.3	419.6	424.9
9:23:00	14.0	13.8	11.0	11.2	418.1	423.4
9:24:00	14.0	13.7	11.0	11.2	418.6	423.8
9:25:00	14.0	13.7	11.0	11.2	418.4	423.6
9:26:00	14.0	13.7	11.0	11.2	419.2	424.4
9:27:00	13.9	13.7	11.0	11.3	421.7	427.1

Test 3 **Kiln Stack**						
Date	6-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
9:28:00	13.9	13.6	11.1	11.3	425.5	430.9
9:29:00	13.9	13.7	11.0	11.3	422.5	427.9
9:30:00	13.9	13.6	11.1	11.3	436.8	442.4
9:31:00	13.9	13.6	11.0	11.3	438.6	444.2
9:32:00	13.9	13.6	11.1	11.3	437.5	443.1
9:33:00	13.8	13.6	11.1	11.3	436.6	442.2
9:34:00	13.9	13.6	11.1	11.3	439.9	445.5
9:35:00	14.0	13.7	11.0	11.2	438.6	444.2
9:36:00	14.1	13.8	10.9	11.1	438.6	444.2
9:37:00	14.2	13.9	10.9	11.1	437.1	442.7
9:38:00	14.2	13.9	10.9	11.1	439.2	444.8
9:39:00	14.2	13.9	10.8	11.1	437.9	443.5
9:40:00	14.2	13.9	10.8	11.1	535.4	542.6
9:41:00	14.2	13.9	10.9	11.1	535.5	542.8
9:42:00	14.3	14.0	10.8	11.0	535.5	542.7
9:43:00	14.3	14.0	10.8	11.0	535.9	543.1
9:44:00	14.3	14.0	10.8	11.0	537.2	544.5
9:45:00	14.4	14.1	10.7	10.9	536.0	543.2
9:46:00	14.4	14.1	10.7	10.9	536.7	544.0
9:47:00	14.4	14.1	10.7	10.9	536.9	544.1
9:48:00	14.4	14.2	10.6	10.8	537.6	544.9
9:49:00	14.4	14.1	10.7	10.9	537.1	544.4
9:50:00	14.4	14.2	10.6	10.8	535.8	543.1
9:51:00	14.1	13.9	10.4	10.7	534.5	541.7
9:52:00	14.1	13.8	10.4	10.6	534.3	541.5
9:53:00	14.1	13.8	10.4	10.6	536.2	543.4
9:54:00	14.1	13.8	10.5	10.7	536.7	543.9
9:55:00	14.1	13.8	10.5	10.7	536.0	543.2
9:56:00	14.1	13.8	10.5	10.7	536.9	544.2
9:57:00	14.1	13.8	10.5	10.7	536.8	544.1
9:58:00	14.1	13.8	10.5	10.7	538.0	545.3
9:59:00	14.1	13.8	10.5	10.7	537.4	544.7
10:00:00	13.1	12.8	10.8	11.1	638.4	647.4
10:01:00	13.2	13.0	10.9	11.2	635.6	644.5
10:02:00	12.8	12.6	10.9	11.1	636.3	645.2
10:03:00	12.5	12.3	11.0	11.2	636.4	645.3
10:04:00	13.4	13.2	10.9	11.2	637.5	646.5
10:05:00	13.6	13.3	10.9	11.1	635.8	644.7
10:06:00	13.5	13.2	10.9	11.1	636.4	645.3
10:07:00	13.7	13.4	10.8	11.0	638.5	647.5
10:08:00	13.6	13.3	10.7	10.9	636.5	645.4
10:09:00	13.7	13.4	10.7	10.9	639.1	648.0
10:10:00	13.8	13.5	10.7	10.9	637.7	646.6
11:15:00	13.9	13.6	10.9	11.1	638.3	647.2
11:16:00	13.1	12.8	11.0	11.2	640.2	649.2
11:17:00	13.1	12.8	11.0	11.2	639.2	648.2
11:18:00	13.1	12.9	10.9	11.2	638.7	647.7
11:19:00	13.1	12.9	10.9	11.2	637.8	646.8
11:20:00	13.2	12.9	10.9	11.1	636.7	645.6
11:21:00	13.2	12.9	10.9	11.1	638.4	647.3

Test 3 **Kiln Stack**						
Date	6-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
11:22:00	13.3	13.0	10.8	11.0	637.4	646.4
11:23:00	13.2	13.0	10.9	11.1	638.2	647.2
11:24:00	13.2	13.0	10.8	11.1	637.6	646.6
11:25:00	13.1	12.8	10.9	11.2	638.7	647.7
11:26:00	13.1	12.9	10.9	11.1	638.6	647.6
11:27:00	13.0	12.8	11.0	11.2	638.1	647.0
11:28:00	13.1	12.8	10.9	11.2	439.1	444.7
11:29:00	13.1	12.9	10.9	11.1	439.7	445.3
11:30:00	13.2	12.9	10.9	11.1	439.1	444.8
11:31:00	13.3	13.1	10.8	11.0	419.0	424.2
11:32:00	13.5	13.2	10.7	10.9	421.6	427.0
11:33:00	13.5	13.2	10.7	10.9	414.6	419.8
11:34:00	13.4	13.2	10.7	10.9	420.5	425.8
11:35:00	13.4	13.1	10.8	11.0	418.7	424.0
11:36:00	13.5	13.2	10.7	10.9	421.3	426.6
11:37:00	13.6	13.3	10.6	10.8	419.7	425.0
11:38:00	13.5	13.2	10.7	10.9	421.9	427.2
11:39:00	13.7	13.4	10.5	10.7	418.4	423.6
11:40:00	13.6	13.3	10.6	10.8	420.6	425.9
11:41:00	13.7	13.4	10.5	10.7	419.2	424.5
11:42:00	13.8	13.5	10.4	10.6	419.8	425.1
11:43:00	13.9	13.6	10.4	10.6	420.3	425.6
11:44:00	13.8	13.6	10.3	10.5	420.1	425.4
11:45:00	13.3	13.0	10.1	10.3	419.7	425.0
11:46:00	13.6	13.3	10.0	10.2	420.4	425.7
11:47:00	13.7	13.4	9.9	10.1	420.1	425.4
11:48:00	13.6	13.4	9.9	10.1	419.3	424.6
11:49:00	13.6	13.4	9.9	10.1	417.6	422.8
11:50:00	13.6	13.3	9.9	10.1	419.9	425.1
11:51:00	13.6	13.4	9.9	10.1	418.4	423.6
11:52:00	13.6	13.4	9.9	10.1	419.6	424.9
11:53:00	13.6	13.4	9.9	10.1	419.7	425.0
11:54:00	13.6	13.3	10.0	10.2	417.5	422.8
11:55:00	13.6	13.3	10.0	10.1	417.9	423.2
11:56:00	13.6	13.3	10.0	10.2	416.5	421.8
11:57:00	13.6	13.3	9.9	10.1	418.1	423.4
11:58:00	13.6	13.4	9.9	10.1	418.5	423.8
11:59:00	13.5	13.3	10.0	10.2	418.7	424.0
12:00:00	13.6	13.3	10.0	10.2	569.9	577.7
12:01:00	13.5	13.2	10.0	10.2	571.0	578.8
12:02:00	13.5	13.2	10.0	10.2	568.1	575.9
12:03:00	13.6	13.3	10.0	10.2	567.0	574.7
12:04:00	13.6	13.3	10.0	10.2	566.3	574.1
12:05:00	13.6	13.3	10.0	10.2	567.9	575.7
12:06:00	13.5	13.3	10.0	10.2	567.8	575.5
12:07:00	13.5	13.2	10.0	10.2	567.3	575.1
12:08:00	13.5	13.2	10.0	10.2	569.7	577.4
12:09:00	13.5	13.3	10.0	10.2	568.1	575.9
12:10:00	13.5	13.2	10.0	10.2	567.9	575.7
12:11:00	13.5	13.2	10.0	10.2	568.0	575.8

Test 3 **Kiln Stack**						
Date	6-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
12:12:00	13.4	13.1	10.1	10.3	566.1	573.8
12:13:00	13.4	13.2	10.0	10.2	566.6	574.3
12:14:00	13.4	13.1	10.1	10.3	570.2	578.0
12:15:00	13.1	12.9	10.3	10.5	569.1	576.9
12:16:00	13.3	13.1	10.1	10.3	567.6	575.3
12:17:00	13.2	12.9	10.3	10.5	567.8	575.5
12:18:00	13.1	12.9	10.3	10.5	566.9	574.7
12:19:00	12.7	12.5	10.6	10.8	418.1	423.4
12:20:00	13.1	12.8	10.3	10.5	418.2	423.4
12:21:00	13.0	12.8	10.3	10.5	419.7	425.0
12:22:00	13.0	12.8	10.3	10.5	418.4	423.6
12:23:00	12.4	12.2	10.7	11.0	416.6	421.8
12:24:00	12.7	12.4	10.6	10.8	417.9	423.2
12:25:00	12.8	12.6	10.4	10.6	416.9	422.2
12:26:00	13.0	12.7	10.3	10.5	416.1	421.3
12:27:00	13.1	12.8	10.3	10.5	418.6	423.8
12:28:00	12.9	12.6	10.4	10.6	418.5	423.8
12:29:00	12.6	12.3	10.6	10.8	417.4	422.7
12:30:00	13.5	13.2	10.5	10.7	418.0	423.2
12:31:00	13.7	13.4	10.4	10.6	416.5	421.7
12:32:00	13.5	13.3	10.6	10.8	417.0	422.3
12:33:00	13.6	13.4	10.5	10.7	418.2	423.4
12:34:00	13.5	13.2	10.6	10.8	416.1	421.3
12:35:00	13.6	13.3	10.5	10.7	416.3	421.5
12:36:00	13.6	13.4	10.5	10.7	418.1	423.3
12:37:00	13.7	13.4	10.5	10.7	416.9	422.1
12:38:00	13.5	13.2	10.6	10.8	416.0	421.2
12:39:00	13.5	13.2	10.6	10.8	417.1	422.3
12:40:00	13.5	13.2	10.6	10.8	415.6	420.8
12:41:00	13.5	13.2	10.6	10.9	415.2	420.4
12:42:00	13.6	13.3	10.6	10.8	450.6	456.4
12:43:00	13.6	13.4	10.5	10.7	453.1	458.9
12:44:00	13.6	13.3	10.6	10.8	449.0	454.8
12:45:00	13.7	13.4	10.5	10.7	447.9	453.6
12:46:00	13.6	13.3	10.6	10.8	447.1	452.9
12:47:00	13.7	13.4	10.5	10.7	448.1	453.9
12:48:00	13.7	13.4	10.5	10.7	447.5	453.2
12:49:00	13.7	13.5	10.5	10.7	450.1	455.9
12:50:00	13.6	13.4	10.5	10.7	448.9	454.7
12:51:00	13.6	13.3	10.6	10.8	449.5	455.3
12:52:00	13.5	13.3	10.6	10.8	449.0	454.8
12:53:00	13.7	13.4	10.4	10.7	446.2	451.9
12:54:00	13.6	13.4	10.5	10.7	449.5	455.2
12:55:00	13.6	13.3	10.5	10.7	450.3	456.1
12:56:00	13.4	13.2	10.6	10.8	450.3	456.1
12:57:00	13.4	13.1	10.6	10.8	452.2	458.0
12:58:00	13.9	13.6	10.6	10.8	449.0	454.7
12:59:00	13.8	13.5	10.6	10.8	444.1	449.8
13:00:00	13.9	13.6	10.6	10.8	451.0	456.8
13:01:00	13.9	13.6	10.6	10.8	449.8	455.6

Test 3 **Kiln Stack**						
Date	6-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
13:02:00	13.8	13.5	10.6	10.8	448.8	454.5
13:03:00	14.0	13.8	10.4	10.7	448.1	453.9
13:04:00	13.9	13.6	10.6	10.8	401.9	406.9
13:05:00	13.9	13.6	10.6	10.8	402.5	407.5
13:06:00	13.8	13.6	10.6	10.8	302.9	306.2
13:07:00	13.8	13.5	10.6	10.8	306.1	309.5
13:08:00	13.8	13.5	10.6	10.8	309.1	312.5
13:09:00	13.7	13.4	10.7	10.9	313.5	317.0
13:10:00	13.6	13.3	10.8	11.0	315.7	319.2
13:11:00	13.6	13.3	10.8	11.0	322.8	326.5
13:12:00	13.6	13.3	10.8	11.0	325.7	329.4
13:13:00	13.5	13.3	10.8	11.0	329.7	333.5
13:14:00	13.6	13.4	10.7	10.9	330.8	334.6
13:15:00	13.8	13.5	10.6	10.8	333.3	337.2
13:16:00	13.8	13.5	10.6	10.8	331.5	335.3
13:17:00	13.7	13.4	10.7	10.9	244.0	246.4
13:18:00	13.9	13.6	10.6	10.8	242.3	244.6
13:19:00	14.1	13.8	10.4	10.6	241.4	243.7
13:20:00	14.0	13.7	10.5	10.7	246.7	249.1
13:21:00	14.0	13.7	10.5	10.7	239.5	241.7
16:19:00	13.8	13.5	10.6	10.8	239.3	241.5
16:20:00	13.9	13.7	10.5	10.7	241.3	243.6
16:21:00	14.1	13.8	10.3	10.5	241.0	243.3
16:22:00	14.1	13.8	10.4	10.6	239.8	242.0
16:23:00	13.9	13.6	10.5	10.8	238.3	240.5
16:24:00	13.7	13.4	10.7	10.9	235.2	237.4
16:25:00	13.9	13.6	10.5	10.7	238.7	241.0
16:26:00	14.0	13.8	10.4	10.6	238.3	240.6
16:27:00	13.8	13.6	10.5	10.7	242.6	244.9
16:28:00	13.9	13.6	10.5	10.7	239.8	242.1
16:29:00	14.0	13.8	10.4	10.6	239.1	241.4
16:30:00	14.0	13.7	10.5	10.7	239.7	242.0
16:31:00	13.9	13.6	10.5	10.7	240.1	242.3
16:32:00	14.0	13.7	10.4	10.6	240.8	243.1
16:33:00	14.1	13.9	10.3	10.5	241.3	243.6
16:34:00	14.1	13.8	10.3	10.5	236.9	239.1
16:35:00	13.9	13.7	10.4	10.7	238.0	240.3
16:36:00	13.8	13.5	10.6	10.8	238.7	241.0
16:37:00	13.9	13.6	10.5	10.7	238.5	240.8
16:38:00	14.1	13.8	10.3	10.5	236.8	239.0
16:39:00	14.1	13.8	10.4	10.6	240.1	242.4
16:40:00	13.7	13.5	10.6	10.8	239.2	241.5
16:41:00	13.8	13.6	10.5	10.8	237.8	240.1
16:42:00	13.9	13.6	10.5	10.7	197.3	198.9
16:43:00	14.1	13.8	10.4	10.6	193.3	194.8
16:44:00	14.1	13.8	10.4	10.6	193.0	194.5
16:45:00	14.2	13.9	10.3	10.5	196.5	198.0
16:46:00	14.0	13.7	10.4	10.6	197.4	199.0
16:47:00	14.0	13.8	10.4	10.6	198.7	200.3
16:48:00	14.2	13.9	10.3	10.5	196.9	198.5

Test 3 **Kiln Stack**						
Date	6-Dec-18					
Analyzer	**O_2**		**CO_2**		**CO**	
Low						
16:49:00	14.1	13.8	10.3	10.5	198.8	200.4
16:50:00	14.0	13.7	10.4	10.6	199.7	201.3
16:51:00	13.7	13.5	10.6	10.8	199.8	201.5
16:52:00	13.8	13.5	10.6	10.8	199.4	201.0
16:53:00	13.7	13.4	10.6	10.8	199.7	201.3
16:54:00	13.8	13.5	10.6	10.8	198.4	199.9
16:55:00	13.6	13.4	10.6	10.8	199.0	200.6
16:56:00	13.5	13.3	10.7	10.9	199.4	201.0
16:57:00	13.6	13.3	10.7	10.9	201.1	202.8
16:58:00	13.4	13.2	10.8	11.0	200.9	202.5
16:59:00	13.5	13.3	10.7	10.9	200.5	202.1
17:00:00	13.7	13.4	10.8	11.0	198.6	200.2
17:01:00	13.6	13.3	10.9	11.1	198.7	200.3
17:02:00	13.6	13.3	10.9	11.1	198.2	199.8
17:03:00	13.7	13.4	10.8	11.1	201.2	202.9
17:04:00	13.6	13.4	10.9	11.1	204.1	205.8
17:05:00	13.9	13.6	10.7	10.9	205.4	207.1
17:39:00	13.8	13.6	10.7	10.9	206.0	207.7
17:40:00	14.1	13.8	10.5	10.7	203.9	205.6
17:41:00	13.9	13.6	10.7	10.9	202.9	204.6
17:42:00	13.9	13.6	10.7	10.9	201.6	203.2
17:43:00	13.9	13.6	10.6	10.9	200.9	202.5
17:44:00	14.0	13.7	10.6	10.8	201.3	202.9
17:45:00	14.1	13.8	10.5	10.7	201.9	203.5
17:46:00	14.1	13.9	10.5	10.7	201.8	203.4
17:47:00	14.1	13.8	10.5	10.7	201.0	202.6
17:48:00	14.1	13.8	10.5	10.7	198.9	200.5
17:49:00	14.2	14.0	10.4	10.6	199.1	200.7
17:50:00	14.1	13.8	10.5	10.7	205.7	207.4
17:51:00	14.0	13.8	10.6	10.8	223.1	225.1
17:52:00	14.2	13.9	10.5	10.7	218.7	220.7
17:53:00	14.1	13.8	10.5	10.7	218.6	220.5
17:54:00	14.2	14.0	10.4	10.6	218.6	220.6
17:55:00	14.2	13.9	10.4	10.6	218.8	220.7
17:56:00	14.2	13.9	10.4	10.7	220.6	222.6
17:57:00	14.2	13.9	10.5	10.7	220.9	222.9
17:58:00	14.0	13.7	10.6	10.8	221.8	223.8
17:59:00	14.1	13.8	10.5	10.7	221.4	223.4
18:00:00	13.9	13.7	10.6	10.8	222.0	223.9
18:01:00	14.1	13.8	10.5	10.7	220.6	222.6
18:02:00	14.0	13.8	10.5	10.7	221.6	223.6
18:03:00	14.2	13.9	10.5	10.7	222.6	224.6
18:04:00	14.1	13.8	10.5	10.7	223.6	225.6
18:05:00	14.2	14.0	10.4	10.6	224.6	226.6
18:06:00	14.1	13.8	10.5	10.7	225.6	227.7
18:07:00	14.0	13.8	10.6	10.8	226.6	228.7
18:08:00	14.2	13.9	10.5	10.7	227.6	229.7
18:09:00	14.1	13.8	10.5	10.7	228.6	230.7
18:10:00	14.2	14.0	10.4	10.6	229.6	231.7

Test 3 **Kiln Stack**			
Date	6-Dec-18		
Analyzer	**O_2**	**CO_2**	**CO**
Low			

Summary of CEM Data

Kiln Stack, Baseline

O_2 (%)	CO (ppm)	CO_2 (%)
14.0	226.3	10.6

Test ID: Date: 7-Dec-18

Time	O_2 (%)	CO (ppm)	CO_2 (%)
8:24 to 12:32	13.6	235.5	10.6

Test ID: Date: 7-Dec-18

Time	O_2 (%)	CO (ppm)	CO_2 (%)
13:30 to 17:40	14.1	223.7	10.7

Test ID: Date: 8-Dec-18

Time	O_2 (%)	CO (ppm)	CO_2 (%)
7:56 to 12:15	14.2	219.6	10.6

Test 1
Kiln Stack

Date	7-Dec-18	
Analyzer	**Stack THC**	
Low		
Zero Value *(Cv)*	0.0	
Direct *(C Dir)*	0	
Calibration Error *(ACE)*	0.00%	*PASS*
System Initial *(Csi)*	0.30	
System Post *(Csf)*	0.50	
Average *(Co)*	0.40	
System Bias Initial *(SBi)*	0.1%	*PASS*
System Bias Post *(SBf)*	0.1%	*PASS*
Drift Assessment *(D)*	0.04%	*PASS*
Mid		
Mid Value *(Cv)*	100.30	
Direct *(C Dir)*	99.8	
Calibration Error *(ACE)*	-0.10%	*PASS*
System Initial *(Csi)*	101.6	
System Post *(Csf)*	103.5	
Average *(Cm)*	101.6	
System Bias Initial *(SBi)*	0.4%	*PASS*
System Bias Post *(SBf)*	0.7%	*PASS*
Drift Assessment *(D)*	0.38%	*PASS*
High		
High Value *(CS/Cv)*	501.0	
Direct *(C Dir)*	502.3	
Calibration Error *(ACE)*	0.26%	*PASS*
System Initial *(Csi)*		
System Post *(Csf)*		
Average *(Cm)*	-	
System Bias Initial *(SBi)*	N/A	-
System Bias Post *(SBf)*	N/A	-
Drift Assessment *(D)*	N/A	-
Analyser Span (Range)	300	
Average	131.04	129.47
Time	**Recorded**	**Corrected**
8:24:00	125.59	124.08
8:25:00	121.49	120.01
8:26:00	105.18	103.85
8:27:00	108.67	107.31
8:28:00	110.12	108.75
8:29:00	127.12	125.60
8:30:00	129.53	127.98
8:31:00	114.20	112.79
8:32:00	116.85	115.41
8:33:00	102.21	100.90
8:34:00	96.69	95.43
8:35:00	113.32	111.91
8:36:00	124.08	122.58

Test 1 **Kiln Stack**		
Date	7-Dec-18	
Analyzer	**Stack THC**	
Low		
8:37:00	126.31	124.79
8:38:00	114.87	113.45
8:39:00	109.64	108.26
8:40:00	112.86	111.46
8:41:00	110.63	109.25
8:42:00	111.68	110.29
8:43:00	128.66	127.12
8:44:00	131.64	130.07
8:45:00	134.69	133.10
8:46:00	128.30	126.76
8:47:00	136.63	135.02
8:48:00	147.68	145.97
8:49:00	133.23	131.65
8:50:00	142.10	140.44
8:51:00	136.03	134.43
8:52:00	126.29	124.77
8:53:00	136.65	135.04
8:54:00	143.46	141.79
8:55:00	148.55	146.83
8:56:00	158.76	156.95
8:57:00	154.18	152.41
8:58:00	135.05	133.45
8:59:00	150.02	148.29
9:00:00	136.32	134.71
9:01:00	141.36	139.70
9:02:00	153.51	151.75
9:03:00	142.14	140.48
9:04:00	132.97	131.39
9:05:00	138.86	137.23
9:06:00	126.90	125.37
9:07:00	135.27	133.68
9:08:00	142.01	140.35
9:09:00	139.06	137.42
9:10:00	132.16	130.59
9:11:00	123.73	122.23
9:12:00	144.35	142.67
9:13:00	140.10	138.46
9:14:00	135.73	134.13
9:15:00	142.10	140.44
9:16:00	133.71	132.13
9:17:00	127.55	126.02
9:18:00	137.02	135.41
9:19:00	154.70	152.93

Test 1 **Kiln Stack**		
Date	7-Dec-18	
Analyzer	**Stack THC**	
Low		
9:20:00	140.83	139.18
9:21:00	134.19	132.60
9:22:00	126.89	125.37
9:23:00	147.73	146.02
9:24:00	145.89	144.20
9:25:00	149.36	147.63
9:26:00	134.43	132.84
9:27:00	123.34	121.85
9:28:00	125.33	123.82
9:29:00	140.96	139.31
9:30:00	155.52	153.74
9:31:00	149.57	147.84
9:32:00	144.68	143.00
9:33:00	134.47	132.88
9:34:00	140.14	138.50
9:35:00	132.94	131.36
9:36:00	148.16	146.45
9:37:00	153.96	152.19
9:38:00	154.30	152.53
9:39:00	141.92	140.26
9:40:00	131.90	130.33
9:41:00	133.72	132.14
9:42:00	135.81	134.20
9:43:00	121.03	119.55
9:44:00	126.60	125.08
9:45:00	132.22	130.65
9:46:00	105.96	104.62
9:47:00	103.32	102.00
9:48:00	123.82	122.32
9:49:00	119.35	117.89
9:50:00	116.69	115.25
9:51:00	110.98	109.60
9:52:00	116.48	115.05
9:53:00	114.16	112.75
9:54:00	125.32	123.81
9:55:00	111.67	110.28
9:56:00	139.98	138.34
9:57:00	116.43	115.00
9:58:00	97.20	95.94
9:59:00	103.28	101.96
10:00:00	111.31	109.93
10:01:00	141.15	139.50
10:02:00	130.12	128.56

Test 1 **Kiln Stack**		
Date	7-Dec-18	
Analyzer	**Stack THC**	
Low		
10:03:00	129.03	127.48
10:04:00	105.60	104.26
10:05:00	99.46	98.18
10:06:00	112.19	110.80
10:07:00	124.28	122.78
10:08:00	122.00	120.52
10:09:00	121.92	120.44
10:10:00	113.94	112.53
10:11:00	117.02	115.58
10:12:00	120.43	118.96
10:13:00	142.93	141.26
10:14:00	124.96	123.45
10:15:00	155.05	153.28
10:16:00	163.90	162.05
10:17:00	121.53	120.06
10:18:00	116.22	114.79
10:19:00	127.65	126.12
10:20:00	124.71	123.21
10:21:00	129.87	128.32
10:22:00	124.62	123.11
10:23:00	118.54	117.09
10:24:00	119.37	117.91
10:25:00	128.17	126.64
10:26:00	124.60	123.10
10:27:00	139.82	138.18
10:28:00	128.46	126.92
10:29:00	99.55	98.27
10:30:00	102.92	101.60
10:31:00	105.12	103.79
10:32:00	132.57	130.99
10:33:00	130.97	129.41
10:34:00	122.20	120.71
10:35:00	112.06	110.66
10:36:00	93.31	92.08
10:37:00	110.16	108.78
10:38:00	112.20	110.80
10:39:00	113.85	112.44
10:40:00	124.44	122.94
10:41:00	117.80	116.35
10:42:00	106.42	105.07
10:43:00	96.44	95.19
10:44:00	130.86	129.30
10:45:00	116.33	114.90

Test 1 **Kiln Stack**		
Date	7-Dec-18	
Analyzer	**Stack THC**	
Low		
10:46:00	115.43	114.01
10:47:00	123.46	121.97
10:48:00	134.08	132.49
10:49:00	104.93	103.60
10:50:00	101.33	100.04
10:51:00	105.92	104.58
10:52:00	127.63	126.10
10:53:00	102.24	100.93
10:54:00	128.70	127.16
10:55:00	144.14	142.46
10:56:00	147.46	145.75
10:57:00	155.89	154.11
10:58:00	163.44	161.59
10:59:00	151.76	150.02
11:00:00	138.79	137.16
11:01:00	129.95	128.40
11:02:00	131.96	130.39
11:03:00	144.11	142.44
11:04:00	150.19	148.46
11:05:00	164.93	163.06
11:06:00	144.27	142.59
11:07:00	143.82	142.15
11:08:00	153.60	151.84
11:09:00	156.61	154.82
11:10:00	136.45	134.84
11:11:00	147.47	145.76
11:12:00	146.10	144.41
11:13:00	137.46	135.84
11:14:00	144.42	142.74
11:15:00	147.73	146.02
11:16:00	164.16	162.30
11:17:00	144.78	143.10
11:18:00	140.82	139.17
11:19:00	128.56	127.02
11:20:00	140.60	138.95
11:21:00	154.67	152.90
11:22:00	154.30	152.53
11:23:00	145.94	144.24
11:24:00	143.93	142.25
11:25:00	129.93	128.38
11:26:00	128.47	126.93
11:27:00	123.31	121.81
11:28:00	142.07	140.41

Test 1 **Kiln Stack**		
Date	7-Dec-18	
Analyzer	**Stack THC**	
Low		
11:29:00	144.43	142.75
11:30:00	127.71	126.18
11:31:00	127.69	126.16
11:32:00	127.81	126.28
11:33:00	127.73	126.20
11:34:00	127.18	125.65
11:35:00	126.98	125.46
11:36:00	127.78	126.25
11:37:00	127.67	126.14
11:38:00	127.73	126.20
11:39:00	127.68	126.14
11:40:00	127.75	126.21
11:41:00	127.70	126.17
11:42:00	127.10	125.57
11:43:00	127.74	126.21
11:44:00	127.28	125.75
11:45:00	127.75	126.22
11:46:00	127.73	126.19
11:47:00	127.72	126.19
11:48:00	127.72	126.18
11:49:00	127.74	126.21
11:50:00	127.92	126.39
11:51:00	127.08	125.55
11:52:00	140.96	139.31
11:53:00	140.91	139.26
11:54:00	151.35	149.61
11:55:00	161.80	159.96
11:56:00	172.24	170.31
11:57:00	143.68	142.01
11:58:00	154.13	152.36
11:59:00	164.57	162.71
12:00:00	165.57	163.70
12:01:00	166.57	164.69
12:02:00	167.57	165.68
12:03:00	168.57	166.67
12:04:00	169.57	167.66
12:05:00	170.57	168.66
12:06:00	141.57	139.91
12:07:00	142.57	140.91
12:08:00	143.57	141.90
12:09:00	144.57	142.89
12:10:00	145.57	143.88
12:11:00	146.57	144.87

Test 1 **Kiln Stack**		
Date	7-Dec-18	
Analyzer	**Stack THC**	
Low		
12:12:00	147.57	145.86
12:13:00	148.57	146.85
12:14:00	149.57	147.84
12:15:00	150.57	148.83
12:16:00	151.57	149.83
12:17:00	152.57	150.82
12:18:00	153.57	151.81
12:19:00	154.57	152.80
12:20:00	155.57	153.79
12:21:00	156.57	154.78
12:22:00	157.57	155.77
12:23:00	158.57	156.76
12:24:00	159.57	157.75
12:25:00	160.57	158.74
12:26:00	161.57	159.74
12:27:00	162.57	160.73
12:28:00	163.57	161.72
12:29:00	164.57	162.71
12:30:00	165.57	163.70
12:31:00	166.57	164.69
12:32:00	167.57	165.68

Test 2
Kiln Stack

Date	7-Dec-18	
Analyzer	**Stack THC**	
Low		
Zero Value *(Cv)*	0.0	
Direct *(C Dir)*	0	
Calibration Error *(ACE)*	0.00%	*PASS*
System Initial *(Csi)*	0.60	
System Post *(Csf)*	0.70	
Average *(Co)*	0.65	
System Bias Initial *(SBi)*	0.1%	*PASS*
System Bias Post *(SBf)*	0.1%	*PASS*
Drift Assessment *(D)*	0.02%	*PASS*
Mid		
Mid Value *(Cv)*	100.30	
Direct *(C Dir)*	100.1	
Calibration Error *(ACE)*	-0.04%	*PASS*
System Initial *(Csi)*	102.3	
System Post *(Csf)*	102.6	
Average *(Cm)*	102.3	
System Bias Initial *(SBi)*	0.4%	*PASS*
System Bias Post *(SBf)*	0.5%	*PASS*
Drift Assessment *(D)*	0.06%	*PASS*
High		
High Value *(CS/Cv)*	501.0	
Direct *(C Dir)*	501.4	
Calibration Error *(ACE)*	0.08%	*PASS*
System Initial *(Csi)*		
System Post *(Csf)*		
Average *(Cm)*	-	
System Bias Initial *(SBi)*	N/A	-
System Bias Post *(SBf)*	N/A	-
Drift Assessment *(D)*	N/A	-
Analyser Span (Range)	300	
Average	127.15	124.82
Time	**Recorded**	**Corrected**
13:30:00	121.47	119.22
13:31:00	120.12	117.89
13:32:00	120.66	118.41
13:33:00	120.19	117.95
13:34:00	121.16	118.91
13:35:00	123.07	120.80
13:36:00	119.92	117.69
13:37:00	121.39	119.14
13:38:00	122.23	119.97
13:39:00	117.97	115.76
13:40:00	120.54	118.29
13:41:00	118.86	116.64
13:42:00	118.66	116.44

Test 2
Kiln Stack

Date	7-Dec-18	
Analyzer	**Stack THC**	
Low		
13:43:00	119.87	117.63
13:44:00	119.63	117.40
13:45:00	118.15	115.94
13:46:00	118.56	116.35
13:47:00	118.37	116.15
13:48:00	119.16	116.94
13:49:00	121.74	119.48
13:50:00	125.55	123.24
13:51:00	122.53	120.27
13:52:00	136.80	134.34
13:53:00	138.59	136.10
13:54:00	137.50	135.03
13:55:00	136.63	134.17
13:56:00	139.90	137.40
13:57:00	138.64	136.16
13:58:00	138.56	136.08
13:59:00	137.07	134.61
14:00:00	139.21	136.72
14:01:00	137.89	135.41
14:02:00	135.36	132.92
14:03:00	135.54	133.09
14:04:00	135.45	133.01
14:05:00	135.85	133.41
14:06:00	137.25	134.78
14:07:00	135.98	133.53
14:08:00	136.70	134.25
14:09:00	136.89	134.43
14:10:00	137.62	135.15
14:11:00	137.12	134.66
14:12:00	135.82	133.37
14:13:00	134.48	132.05
14:14:00	134.32	131.90
14:15:00	136.21	133.76
14:16:00	136.67	134.21
14:17:00	136.00	133.55
14:18:00	136.91	134.45
14:19:00	136.80	134.35
14:20:00	137.99	135.51
14:21:00	137.44	134.98
14:22:00	138.43	135.95
14:23:00	135.55	133.11
14:24:00	136.33	133.87
14:25:00	136.40	133.95

Test 2
Kiln Stack

Date	7-Dec-18	
Analyzer	**Stack THC**	
Low		
14:26:00	137.54	135.07
14:27:00	135.76	133.31
14:28:00	136.38	133.93
14:29:00	138.53	136.05
14:30:00	136.46	134.01
14:31:00	139.07	136.59
14:32:00	137.67	135.20
14:33:00	138.28	135.80
14:34:00	140.23	137.73
14:35:00	139.22	136.73
14:36:00	138.74	136.25
14:37:00	137.82	135.35
14:38:00	136.69	134.23
14:39:00	138.40	135.92
14:40:00	137.44	134.97
14:41:00	138.23	135.75
14:42:00	137.65	135.18
14:43:00	138.72	136.24
14:44:00	138.63	136.15
14:45:00	138.05	135.58
14:46:00	139.10	136.62
14:47:00	139.65	137.16
14:48:00	139.14	136.65
14:49:00	118.97	116.75
14:50:00	121.63	119.38
14:51:00	114.62	112.46
14:52:00	120.51	118.27
14:53:00	118.74	116.52
14:54:00	121.30	119.05
14:55:00	119.67	117.44
14:56:00	121.86	119.60
14:57:00	118.37	116.16
14:58:00	120.56	118.32
14:59:00	119.17	116.95
15:00:00	119.78	117.55
15:01:00	120.29	118.05
15:02:00	120.08	117.85
15:03:00	119.66	117.43
15:04:00	120.36	118.12
15:05:00	120.14	117.90
15:06:00	119.29	117.07
15:07:00	117.56	115.36
15:08:00	119.85	117.62

Test 2
Kiln Stack

Date	7-Dec-18	
Analyzer	**Stack THC**	
Low		
15:09:00	118.38	116.16
15:10:00	119.57	117.34
15:11:00	119.70	117.46
15:12:00	117.51	115.31
15:13:00	117.90	115.69
15:14:00	116.55	114.36
15:15:00	118.11	115.90
15:16:00	118.53	116.31
15:17:00	118.74	116.52
15:18:00	119.90	117.66
15:19:00	120.98	118.73
15:20:00	118.12	115.91
15:21:00	116.99	114.79
15:22:00	116.35	114.16
15:23:00	117.91	115.70
15:24:00	117.76	115.56
15:25:00	117.30	115.10
15:26:00	119.65	117.42
15:27:00	118.10	115.89
15:28:00	117.91	115.70
15:29:00	118.04	115.84
15:30:00	116.11	113.93
15:31:00	116.60	114.41
15:32:00	120.23	118.00
15:33:00	119.12	116.90
15:34:00	117.58	115.38
15:35:00	117.78	115.58
15:36:00	116.91	114.71
15:37:00	118.09	115.88
15:38:00	118.18	115.97
15:39:00	119.69	117.46
15:40:00	118.37	116.16
15:41:00	116.60	114.41
15:42:00	117.95	115.74
15:43:00	116.92	114.73
15:44:00	116.07	113.89
15:45:00	118.55	116.33
15:46:00	118.49	116.27
15:47:00	117.44	115.24
15:48:00	117.96	115.75
15:49:00	116.47	114.28
15:50:00	117.02	114.83
15:51:00	118.18	115.97

Test 2
Kiln Stack

Date	7-Dec-18	
Analyzer	**Stack THC**	
Low		
15:52:00	116.05	113.87
15:53:00	116.28	114.09
15:54:00	118.05	115.84
15:55:00	116.88	114.69
15:56:00	115.96	113.78
15:57:00	117.05	114.85
15:58:00	115.63	113.45
15:59:00	115.22	113.05
16:00:00	150.60	147.96
16:01:00	153.06	150.39
16:02:00	149.00	146.38
16:03:00	147.88	145.27
16:04:00	147.11	144.52
16:05:00	148.10	145.49
16:06:00	147.48	144.88
16:07:00	150.06	147.42
16:08:00	148.90	146.28
16:09:00	149.53	146.91
16:10:00	149.02	146.40
16:11:00	146.20	143.62
16:12:00	149.46	146.83
16:13:00	150.27	147.64
16:14:00	150.31	147.67
16:15:00	152.18	149.52
16:16:00	148.96	146.34
16:17:00	144.10	141.55
16:18:00	150.99	148.35
16:19:00	149.77	147.14
16:20:00	148.77	146.15
16:21:00	148.12	145.51
16:22:00	101.87	99.87
16:23:00	102.50	100.50
16:24:00	102.87	100.86
16:25:00	106.14	104.09
16:26:00	109.10	107.01
16:27:00	113.49	111.35
16:28:00	115.67	113.50
16:29:00	122.80	120.53
16:30:00	125.70	123.39
16:31:00	129.72	127.35
16:32:00	130.80	128.42
16:33:00	133.31	130.90
16:34:00	131.46	129.08

Test 2
Kiln Stack

Date	7-Dec-18	
Analyzer	**Stack THC**	
Low		
16:35:00	135.04	132.60
16:36:00	133.28	130.87
16:37:00	132.39	129.99
16:38:00	137.74	135.27
16:39:00	130.46	128.09
16:40:00	130.26	127.88
16:41:00	132.32	129.92
16:42:00	132.02	129.62
16:43:00	130.76	128.38
16:44:00	129.28	126.92
16:45:00	126.18	123.87
16:46:00	129.74	127.37
16:47:00	129.30	126.95
16:48:00	133.56	131.15
16:49:00	130.80	128.42
16:50:00	130.14	127.77
16:51:00	130.74	128.36
16:52:00	131.05	128.67
16:53:00	131.82	129.42
16:54:00	132.33	129.93
16:55:00	127.89	125.55
16:56:00	129.03	126.68
16:57:00	129.71	127.35
16:58:00	129.54	127.18
16:59:00	127.77	125.43
17:00:00	131.11	128.72
17:01:00	130.18	127.81
17:02:00	128.81	126.46
17:03:00	120.32	118.08
17:04:00	116.28	114.09
17:05:00	116.00	113.81
17:06:00	119.49	117.26
17:07:00	120.44	118.20
17:08:00	121.66	119.41
17:09:00	119.94	117.71
17:10:00	121.78	119.52
17:11:00	122.69	120.42
17:12:00	122.85	120.58
17:13:00	122.40	120.14
17:14:00	122.66	120.39
17:15:00	121.36	119.11
17:16:00	122.05	119.78
17:17:00	122.41	120.15

Test 2
Kiln Stack

Date	7-Dec-18	
Analyzer	**Stack THC**	
Low		
17:18:00	124.14	121.85
17:19:00	123.88	121.60
17:20:00	123.49	121.21
17:21:00	121.58	119.32
17:22:00	121.70	119.44
17:23:00	121.20	118.95
17:24:00	124.23	121.94
17:25:00	127.08	124.75
17:26:00	128.41	126.07
17:27:00	128.97	126.61
17:28:00	126.94	124.61
17:29:00	125.90	123.58
17:30:00	124.57	122.28
17:31:00	123.86	121.57
17:32:00	124.26	121.97
17:33:00	124.87	122.57
17:34:00	124.75	122.45
17:35:00	124.00	121.71
17:36:00	121.94	119.68
17:37:00	122.05	119.79
17:38:00	128.69	126.34
17:39:00	129.36	127.00
17:40:00	131.98	129.59

Test 3
Kiln Stack

Date	8-Dec-18	
Analyzer	**Stack THC**	
Low		
Zero Value *(Cv)*	0.0	
Direct *(C Dir)*	0	
Calibration Error *(ACE)*	0.00%	*PASS*
System Initial *(Csi)*	0.80	
System Post *(Csf)*	1.00	
Average *(Co)*	0.90	
System Bias Initial *(SBi)*	0.2%	*PASS*
System Bias Post *(SBf)*	0.2%	*PASS*
Drift Assessment *(D)*	0.04%	*PASS*
Mid		
Mid Value *(Cv)*	100.30	
Direct *(C Dir)*	100.6	
Calibration Error *(ACE)*	0.06%	*PASS*
System Initial *(Csi)*	102.6	
System Post *(Csf)*	103	
Average *(Cm)*	102.6	
System Bias Initial *(SBi)*	0.4%	*PASS*
System Bias Post *(SBf)*	0.5%	*PASS*
Drift Assessment *(D)*	0.08%	*PASS*
High		
High Value *(CS/Cv)*	501.0	
Direct *(C Dir)*	500.5	
Calibration Error *(ACE)*	-0.10%	*PASS*
System Initial *(Csi)*		
System Post *(Csf)*		
Average *(Cm)*	-	
System Bias Initial *(SBi)*	N/A	-
System Bias Post *(SBf)*	N/A	-
Drift Assessment *(D)*	N/A	-
Analyser Span (Range)	300	
Average	123.81	121.22
Time	**Recorded**	**Corrected**
7:56:00	121.47	118.91
7:57:00	120.12	117.58
7:58:00	120.66	118.11
7:59:00	120.19	117.65
8:00:00	121.16	118.61
8:01:00	123.07	120.49
8:02:00	119.92	117.39
8:03:00	121.39	118.83
8:04:00	122.23	119.66
8:05:00	117.97	115.46
8:06:00	120.54	117.99
8:07:00	118.86	116.34
8:08:00	118.66	116.13

Test 3
Kiln Stack

Date	8-Dec-18	
Analyzer	**Stack THC**	
Low		
8:09:00	119.87	117.33
8:10:00	119.63	117.09
8:11:00	118.15	115.63
8:12:00	118.56	116.04
8:13:00	118.37	115.85
8:14:00	119.16	116.63
8:15:00	121.74	119.17
8:16:00	125.55	122.93
8:17:00	122.53	119.96
8:18:00	136.80	134.02
8:19:00	138.59	135.79
8:20:00	137.50	134.72
8:21:00	136.63	133.86
8:22:00	139.90	137.08
8:23:00	138.64	135.84
8:24:00	138.56	135.77
8:25:00	137.07	134.30
8:26:00	139.21	136.41
8:27:00	137.89	135.10
8:28:00	135.36	132.61
8:29:00	135.54	132.78
8:30:00	135.45	132.70
8:31:00	135.85	133.09
8:32:00	137.25	134.47
8:33:00	135.98	133.22
8:34:00	136.70	133.94
8:35:00	136.89	134.12
8:36:00	137.62	134.84
8:37:00	137.12	134.34
8:38:00	135.82	133.06
8:39:00	134.48	131.74
8:40:00	134.32	131.59
8:41:00	136.21	133.44
8:42:00	136.67	133.90
8:43:00	136.00	133.24
8:44:00	136.91	134.14
8:45:00	136.80	134.03
8:46:00	137.99	135.20
8:47:00	137.44	134.66
8:48:00	138.43	135.63
8:49:00	135.55	132.80
8:50:00	136.33	133.56
8:51:00	136.40	133.63

Test 3
Kiln Stack

Date	8-Dec-18	
Analyzer	**Stack THC**	
Low		
8:52:00	137.54	134.76
8:53:00	135.76	133.00
8:54:00	136.38	133.62
8:55:00	138.53	135.74
8:56:00	136.46	133.69
8:57:00	139.07	136.27
8:58:00	137.67	134.89
8:59:00	138.28	135.48
9:00:00	140.23	137.41
9:01:00	139.22	136.41
9:02:00	138.74	135.94
9:03:00	137.82	135.04
9:04:00	136.69	133.92
9:05:00	138.40	135.60
9:06:00	137.44	134.66
9:07:00	138.23	135.44
9:08:00	137.65	134.87
9:09:00	138.72	135.92
9:10:00	138.63	135.83
9:11:00	138.05	135.26
9:12:00	139.10	136.30
9:13:00	139.65	136.84
9:14:00	139.14	136.34
9:15:00	118.97	116.44
9:16:00	121.63	119.07
9:17:00	114.62	112.16
9:18:00	120.51	117.96
9:19:00	118.74	116.22
9:20:00	121.30	118.74
9:21:00	119.67	117.13
9:22:00	121.86	119.29
9:23:00	118.37	115.86
9:24:00	120.56	118.01
9:25:00	119.17	116.64
9:26:00	119.78	117.24
9:27:00	120.29	117.75
9:28:00	120.08	117.54
9:29:00	119.66	117.13
9:30:00	120.36	117.82
9:31:00	120.14	117.60
9:32:00	119.29	116.76
9:33:00	117.56	115.05
9:34:00	119.85	117.32

Test 3
Kiln Stack

Date	8-Dec-18	
Analyzer	**Stack THC**	
Low		
9:35:00	118.38	115.86
9:36:00	119.57	117.04
9:37:00	119.70	117.16
9:38:00	117.51	115.00
9:39:00	117.90	115.39
9:40:00	116.55	114.06
9:41:00	118.11	115.60
9:42:00	118.53	116.01
9:43:00	118.74	116.22
9:44:00	119.90	117.36
9:45:00	120.98	118.42
9:46:00	118.12	115.61
9:47:00	116.99	114.49
9:48:00	116.35	113.86
9:49:00	117.91	115.39
9:50:00	117.76	115.25
9:51:00	117.30	114.80
9:52:00	119.65	117.12
9:53:00	118.10	115.58
9:54:00	117.91	115.40
9:55:00	118.04	115.53
9:56:00	116.11	113.63
9:57:00	116.60	114.11
9:58:00	120.23	117.69
9:59:00	119.12	116.59
10:00:00	117.58	115.08
10:01:00	117.78	115.27
10:02:00	116.91	114.41
10:03:00	118.09	115.57
10:04:00	118.18	115.66
10:05:00	119.69	117.15
10:06:00	118.37	115.86
10:07:00	116.60	114.11
10:08:00	117.95	115.44
10:09:00	116.92	114.43
10:10:00	116.07	113.59
10:11:00	118.55	116.03
10:12:00	118.49	115.97
10:13:00	117.44	114.94
10:14:00	117.96	115.44
10:15:00	116.47	113.98
10:16:00	117.02	114.52
10:17:00	118.18	115.66

Test 3
Kiln Stack

Date	8-Dec-18	
Analyzer	**Stack THC**	
Low		
10:18:00	116.05	113.57
10:19:00	116.28	113.79
10:20:00	118.05	115.54
10:21:00	116.88	114.38
10:22:00	115.96	113.48
10:23:00	117.05	114.55
10:24:00	115.63	113.15
10:25:00	115.22	112.75
10:26:00	150.60	147.64
10:27:00	153.06	150.07
10:28:00	149.00	146.06
10:29:00	147.88	144.95
10:30:00	147.11	144.20
10:31:00	148.10	145.17
10:32:00	147.48	144.56
10:33:00	150.06	147.10
10:34:00	148.90	145.96
10:35:00	149.53	146.59
10:36:00	149.02	146.08
10:37:00	146.20	143.30
10:38:00	149.46	146.51
10:39:00	150.27	147.32
10:40:00	150.31	147.35
10:41:00	152.18	149.20
10:42:00	148.96	146.02
10:43:00	144.10	141.23
10:44:00	150.99	148.03
10:45:00	149.77	146.82
10:46:00	148.77	145.83
10:47:00	148.12	145.19
10:48:00	101.87	99.58
10:49:00	102.50	100.20
10:50:00	102.87	100.57
10:51:00	106.14	103.79
10:52:00	109.10	106.71
10:53:00	113.49	111.04
10:54:00	115.67	113.19
10:55:00	122.80	120.23
10:56:00	125.70	123.09
10:57:00	129.72	127.04
10:58:00	130.80	128.11
10:59:00	133.31	130.58
11:00:00	131.46	128.77

Test 3
Kiln Stack

Date	8-Dec-18	
Analyzer	**Stack THC**	
Low		
11:01:00	135.04	132.29
11:02:00	133.28	130.56
11:03:00	132.39	129.68
11:04:00	137.74	134.95
11:05:00	130.46	127.78
11:06:00	130.26	127.58
11:07:00	132.32	129.61
11:08:00	132.02	129.31
11:09:00	130.76	128.08
11:10:00	129.28	126.61
11:11:00	126.18	123.56
11:12:00	129.74	127.06
11:13:00	129.30	126.64
11:14:00	133.56	130.84
11:15:00	130.80	128.11
11:16:00	130.14	127.47
11:17:00	130.74	128.05
11:18:00	131.05	128.36
11:19:00	131.82	129.11
11:20:00	132.33	129.62
11:21:00	127.89	125.24
11:22:00	129.03	126.37
11:23:00	129.71	127.04
11:24:00	129.54	126.87
11:25:00	127.77	125.13
11:26:00	131.11	128.41
11:27:00	130.18	127.50
11:28:00	128.81	126.15
11:29:00	88.32	86.22
11:30:00	84.28	82.23
11:31:00	84.00	81.95
11:32:00	87.49	85.40
11:33:00	88.44	86.34
11:34:00	89.66	87.54
11:35:00	87.94	85.85
11:36:00	89.78	87.65
11:37:00	90.69	88.55
11:38:00	90.85	88.71
11:39:00	90.40	88.27
11:40:00	90.66	88.53
11:41:00	89.36	87.24
11:42:00	90.05	87.92
11:43:00	90.41	88.28

Test 3
Kiln Stack

Date	8-Dec-18	
Analyzer	**Stack THC**	
Low		
11:44:00	92.14	89.99
11:45:00	91.88	89.73
11:46:00	91.49	89.34
11:47:00	89.58	87.46
11:48:00	89.70	87.58
11:49:00	89.20	87.08
11:50:00	92.23	90.07
11:51:00	95.08	92.88
11:52:00	96.41	94.20
11:53:00	96.97	94.74
11:54:00	94.94	92.75
11:55:00	93.90	91.72
11:56:00	92.57	90.41
11:57:00	91.86	89.71
11:58:00	92.26	90.10
11:59:00	92.87	90.70
12:00:00	92.75	90.59
12:01:00	92.00	89.84
12:02:00	89.94	87.82
12:03:00	90.05	87.93
12:04:00	126.7	124.06
12:05:00	144.1	141.27
12:06:00	139.7	136.92
12:07:00	139.6	136.76
12:08:00	139.6	136.83
12:09:00	139.8	137.00
12:10:00	141.6	138.78
12:11:00	141.9	139.07
12:12:00	126.7	124.06
12:13:00	144.1	141.27
12:14:00	139.7	136.92
12:15:00	139.6	136.76

APPENDIX G

Sampling for Ammonia and Hydrogen Chloride

Main Stack Baseline

Test :	Test No. 1			Test No. 2			Test No. 3			Average	
Sample ID :	M26-T1			M26-T2			M26-T3				
Sample Volume (Rm^3) [1] :	0.137			0.133			0.127				
Stack Flow Rate (Rm^3/s) [1] :	277.59			285.05			281.17				
	Lab Data (µg)	Conc. (mg/m^3)	Emission Rate (g/s)	Lab Data (µg)	Conc. (mg/m^3)	Emission Rate (g/s)	Lab Data (µg)	Conc. (mg/m^3)	Emission Rate (g/s)	Conc. (mg/m^3)	Emission Rate (g/s)
Hydrochloric Acid	1200	8.78	2.44	500	3.76	1.07	380	3.00	0.84	5.18	1.45
Ammonia (NH_3)	3022	22.10	6.14	3117	23.50	6.69	2267	17.90	5.03	21.20	5.95

Notes:

[1] Sample volume and volumetric flow rate based on dry referenced conditions (101.3kPa, 25 ^{o} C)

[1] Flow rate based on average of isokentic tests conducted that day

Lab results for Ammonium converted to ammonia used molecular wts (17/18)

Sampling for Ammonia and Hydrogen Chloride

Facility:	St. Mary's Bowmanville	**Operator:**	JDF
City:	Bowmanville, Ontario	**Entered by:**	WSC
Source:	Main Stack Baseline	**Checked by:**	KNE
Date:	sept 30 to Oct 2	**Pbar:**	29.62
		Y:	1.013

Time (min)	Orifice Pressure ("H_2O)	Meter Volume (L)	Meter Temp (°F)	Vacuum (in Hg)	Probe Temp (°F)	Condensor Temp (°F)	Sampling Rate (L/min)
Sept 30							
Sample ID = Test #1							
13:10 - 14:10							
0	2.3	0.00	45	-2.0	IN-Stack	45	-
20	2.3	46.23	47	-2.0		45	2.3
40	2.3	87.21	51	-2.0		45	2.0
60	2.3	128.48	54	-2.0		45	2.1
Average	**2.3**		**49**	**-2.0**		**-**	**2.1**
Total Volume Actual (m^3)		0.128					
Total Volume Reference (Rm^3)		**0.137**					
Oct 1							
Sample ID =Test #2							
10:20 - 11:20							
0	2.3	0.00	54	-2.0	IN-Stack	50	-
20	2.3	43.03	54	-2.0		50	2.2
40	2.3	85.12	56	-2.0		52	2.1
60	2.3	126.26	56	-2.0		52	2.1
Average	**2.3**		**55**	**-2.0**		**-**	**2.1**
Total Volume Actual (m^3)		0.126					
Total Volume Reference (Rm^3)		**0.133**					
Oct 2							
Sample ID = Test #3							
10:30 - 11:30							
0	2.3	0.00	53	-3.0	IN-Stack	47	-
20	2.3	40.13	54	-3.0		49	2.0
40	2.3	80.05	56	-3.0		50	2.0
60	2.3	120.34	57	-3.0		52	2.0
Average	**2.3**		**55**	**-3.0**		**-**	**2.0**
Total Volume Actual (m^3)		0.120					
Total Volume Reference (Rm^3)		**0.127**					

Sampling for Ammonia and Hydrogen Chloride

Kiln Stack - Alt Fuels - October

Test :		Test No. 1			Test No. 2			Test No. 3			Average		
Sample ID :		M26-T1			M26-T2			M26-T3					
Sample Volume (Rm^3) [1] :	T1	0.126			0.125			0.124					
Stack Flow Rate (Rm^3/s) [1] :	Lab DL	275			275			271					
		Lab Data	Conc.	Emission Rate	Lab Data	Conc.	Emission Rate	Lab Data	Conc.	Emission Rate	Conc.	Conc. Corrected to 11% O_2 [2]	Emission Rate
	(µg)	**(µg)**	**(mg/m^3)**	**(mg/s)**	**(µg)**	**(mg/m^3)**	**(mg/s)**	**(µg)**	**(mg/m^3)**	**(mg/s)**	**(mg/m^3)**	**(mg/m^3)**	**(mg/s)**
Hydrochloric Acid	<30	470	3.72	1020	440	3.51	970	390	3.15	855	3.46	6.07	949
Ammonia (NH_3)	<75	1983	15.7	4320	1794	14.3	3900	1794	14.50	3940	14.90	26.14	4070

__Notes:__

[1] Sample volume and volumetric flow rate based on dry referenced conditions (101.3kPa, 25 ^{o} C)

[1] Flow rate based on average of higher isokentic tests conducted that day

[2] Correct O_2 to 11% equation ***a*((21-11)/(21-b))*** *a = concentration @ original O_2 b = original O_2 %*

The average %O_2 readings for 15.3

Lab results for Ammonium converted to ammonia used molecular wts (17/18)

Sampling for Ammonia and Hydrogen Chloride

Facility:	St. Mary's Bowmanville	**Operator:**	JDF
City:	Bowmanville, Ontario	**Entered by:**	WSC
Source:	Main Stack Alt Fuels	**Checked by:**	TFL
Date:	Oct 10/12, 2018	**Pbar:**	29.40
		Y:	1.013

Time (min)	**Orifice Pressure ("H_2O)**	**Meter Volume (L)**	**Meter Temp (^oF)**	**Vacuum (in Hg)**	**Probe Temp (^oF)**	**Condensor Temp (^oF)**	**Sampling Rate (L/min)**
10/10/18							
Sample ID = Test #1							
13:00 to 14:00							
0	2.3	0.00	50	-3.0	IN-Stack	48	-
20	2.3	40.23	53	-3.0		48	2.0
40	2.3	79.28	55	-3.0		46	2.0
60	2.3	120.61	58	-3.0		45	2.1
Average	**2.3**		**54**	**-3.0**		**-**	**2.0**
Total Volume Actual (m^3)		0.121					
Total Volume Reference (Rm^3)		**0.126**					
12-Oct-18							
Sample ID =Test #2							
10:00 - 11:00							
0	2.3	0.00	58	-3.0	IN-Stack	59	-
20	2.3	40.78	59	-3.0		50	2.0
40	2.3	81.11	60	-3.0		45	2.0
60	2.3	121.11	62	-3.0		45	2.0
Average	**2.3**		**60**	**-3.0**		**-**	**2.0**
Total Volume Actual (m^3)		0.121					
Total Volume Reference (Rm^3)		**0.125**					
12-Oct-18							
Sample ID = Test #3							
11:10 - 12:10							
0	2.3	0.00	60	-3.0	IN-Stack	59	-
20	2.3	39.37	59	-3.0		54	2.0
40	2.3	80.42	59	-3.0		52	2.1
60	2.3	119.45	59	-3.0		54	2.0
Average	**2.3**		**59**	**-3.0**		**-**	**2.0**
Total Volume Actual (m^3)		0.119					
Total Volume Reference (Rm^3)		**0.124**					

Sampling for Ammonia and Hydrogen Chloride

Kiln Stack Alt Fuel December

Test :		Test No. 1				Test No. 2			Test No. 3			Average		
Sample ID :		M26-T1				M26-T2			M26-T3					
Sample Volume (Rm^3) [1] :	T1	0.127			T2-3	0.132			0.130					
Stack Flow Rate (Rm^3/s) [1] :	Lab DL	288			Lab DL	285			282					
		Lab Data	Conc.	Emission Rate		Lab Data	Conc.	Emission Rate	Lab Data	Conc.	Emission Rate	Conc.	Conc. Corrected to 11% O_2 [2]	Emission Rate
	(µg)	**(µg)**	**(mg/m^3)**	**(mg/s)**	**(µg)**	**(µg)**	**(mg/m^3)**	**(mg/s)**	**(µg)**	**(mg/m^3)**	**(mg/s)**	**(mg/m^3)**	**(mg/m^3)**	**(mg/s)**
Hydrochloric Acid	<30	1400	11.0	3180	30	410	3.12	890	440	3.39	957	5.84	7.6	1670
Ammonia (NH_3)	<75	2928	23.0	6650	38	1983	15.1	4300	2172	16.7	4730	18.30	23.8	5220

<u>Notes:</u>

[1] Sample volume and volumetric flow rate based on dry referenced conditions (101.3kPa, 25 °C)

[1] Flow rate based on average of higher isokentic tests conducted that day

Lab results for Ammonium converted to ammonia used molecular wts (17/18)

[2] Correct O_2 to 11% equation ***a*((21-11)/(21-b))*** *a = concentration @ original O_2 b = original O_2 %*

The average %O_2 readings for Test 1 13.3

Sampling for Ammonia and Hydrogen Chloride

Facility:	St. Mary's Bowmanville	**Operator:**	JDF
City:	Bowmanville, Ontario	**Entered by:**	WSC
Source:	Main Stack	**Checked by:**	DO
Date:	Dec 4-6, 2018	**Pbar:**	29.50
		Y:	1.013

Time (min)	Orifice Pressure ("H_2O)	Meter Volume (L)	Meter Temp (°F)	Vacuum (in Hg)	Probe Temp (°F)	Condensor Temp (°F)	Sampling Rate (L/min)
4-Dec-18							
Sample ID = Test #1							
14:40 to 15:40							
0	2.2	0.00	49	0.0	250	50	-
20	2.2	40.33	48	0.0	251	43	2.0
40	2.2	79.79	46	0.0	250	41	2.0
60	2.2	119.42	45	0.0	250	41	2.0
Average	**2.2**		**47**	**0.0**	**250.3**	**43.8**	**2.0**
Total Volume Actual (m^3)		0.119					
Total Volume Reference (Rm^3)		**0.127**					
5-Dec-18							
Sample ID =Test #2							
11:30 - 12:30							
0	2.2	0.00	23	0.0	IN-Stack	41	-
20	2.2	40.26	38	0.0		41	2.0
40	2.2	80.32	37	0.0		39	2.0
60	2.2	120.43	37	0.0		41	2.0
Average	**2.2**		**34**	**0.0**		**-**	**2.0**
Total Volume Actual (m^3)		0.120					
Total Volume Reference (Rm^3)		**0.132**					
6-Dec-18							
Sample ID = Test #3							
9:30 - 10:30							
0	2.2	0.00	37	0.0	IN-Stack	37	-
20	2.2	40.33	38	0.0		37	2.0
40	2.2	79.77	38	0.0		36	2.0
60	2.2	119.88	39	0.0		34	2.0
Average	**2.2**		**38**	**0.0**		**-**	**2.0**
Total Volume Actual (m^3)		0.120					
Total Volume Reference (Rm^3)		**0.130**					

Sampling for Ammonia and Hydrogen Chloride

Kiln Stack Baseline

Test :		Test No. 1			Test No. 2			Test No. 3			Average		
Sample ID :		M26-T1			M26-T2			M26-T3					
Sample Volume (Rm^3) [1] :	T1	0.128			0.132			0.132					
Stack Flow Rate (Rm^3/s) [1] :	Lab DL	288			295			285					
		Lab Data	Conc.	Emission Rate	Lab Data	Conc.	Emission Rate	Lab Data	Conc.	Emission Rate	Conc.	Conc. Corrected to 11% O_2 [2]	Emission Rate
	(µg)	**(µg)**	**(mg/m^3)**	**(mg/s)**	**(µg)**	**(mg/m^3)**	**(mg/s)**	**(µg)**	**(mg/m^3)**	**(mg/s)**	**(mg/m^3)**	**(mg/m^3)**	**(mg/s)**
Hydrochloric Acid	<30	500	3.92	1130	170	1.28	380	140	1.06	302	2.09	2.99	603
Ammonia (NH3)	<75	1983	15.5	4480	2361	17.8	5300	1133	8.56	2440	14.0	20.0	4060

__Notes:__

[1] Sample volume and volumetric flow rate based on dry referenced conditions (101.3kPa, 25 ^{o} C)

[1] Flow rate based on average of higher isokentic tests conducted that day

Lab results for Ammonium converted to ammonia used molecular wts (17/18)

[2] Correct O_2 to 11% equation ***a*((21-11)/(21-b))*** *a = concentration @ original O_2 b = original O_2 %*

The average %O_2 readings for 14.0

Sampling for Ammonia and Hydrogen Chloride

Facility:	St. Mary's Bowmanville	**Operator:**	MP
City:	Bowmanville, Ontario	**Entered by:**	TFL
Source:	Main Stack	**Checked by:**	KNE
Date:	Dec 7/8, 2018	**Pbar:**	29.90
		Y:	1.013

Time (min)	**Orifice Pressure ("H_2O)**	**Meter Volume (L)**	**Meter Temp (°F)**	**Vacuum (in Hg)**	**Probe Temp (°F)**	**Condensor Temp (°F)**	**Sampling Rate (L/min)**
7-Dec-18							
Sample ID = Test #1							
8:30 - 9:30							
0	2.2	0.00	35	0.0	IN-Stack	-	-
20	2.2	38.41	35	0.0		-	1.9
40	2.2	76.83	33	0.0		-	1.9
60	2.2	115.23	32	0.0		-	1.9
Average	**2.2**		**34**	**0.0**		**-**	**1.9**
Total Volume Actual (m^3)		0.115					
Total Volume Reference (Rm^3)		**0.128**					
7-Dec-18							
Sample ID =Test #2							
11:40 - 12:40							
0	2.2	0.00	33	0.0	IN-Stack	-	-
20	2.2	39.83	34	0.0		-	2.0
40	2.2	78.85	33	0.0		-	2.0
60	2.2	119.45	32	0.0		-	2.0
Average	**2.2**		**33**	**0.0**		**-**	**2.0**
Total Volume Actual (m^3)		0.119					
Total Volume Reference (Rm^3)		**0.132**					
8-Dec-18							
Sample ID = Test #3							
11:20 - 12:20							
0	2.2	0.00	35	0.0	IN-Stack	-	-
20	2.2	40.02	34	0.0		-	2.0
40	2.2	80.02	36	0.0		-	2.0
60	2.2	120.04	38	0.0		-	2.0
Average	**2.2**		**36**	**0.0**		**-**	**2.0**
Total Volume Actual (m^3)		0.120					
Total Volume Reference (Rm^3)		**0.132**					

APPENDIX H

Volatile Organic Compound Sampling

Main Stack Baseline

	Units	**Test #1**			**Test #2**			**Test #3**			**Average**		
Sample ID :		Pair 1 ID = 9			Pair 2 ID = 8			Pair 3 ID = 7					
Sampling Date :	-	Sep 30, 18			Oct 1, 18			Oct 2, 18			-		
Sampling Times :	-	12:10PM-1:10PM			1:20PM - 2:20PM			2:30PM - 3:30PM			-		
Sample Volume[1] :	Rm^3	0.019			0.019			0.018			0.019		
Stack Flow Rate[1], [2]	Rm^3/s	277.6			285.1			281.2			281.3		
		Lab Data (µg)	**Conc** ($\mu g/m^3$)	**Emission Rate** (mg/s)	**Lab Data** (µg)	**Conc** ($\mu g/m^3$)	**Emission Rate** (mg/s)	**Lab Data** (µg)	**Conc** ($\mu g/m^3$)	**Emission Rate** (mg/s)	**Conc** (µg)	**Conc. Corrected to 11% O_2 [3]** (µg/m3)	**Emission Rate** (mg/s)
Dichlorodifluoromethane (FREON 12)		< 0.020	1.1	0.295	0.020	1.1	0.301	< 0.020	1.1	0.309	< 1.07	< 1.8	< 0.302
Chloromethane		4.48	238.3	66.155	5.06	267.4	76.219	4.98	273.5	76.898	260	440.2	73.1
Vinyl Chloride		< 0.013	0.7	0.192	< 0.013	0.7	0.196	< 0.013	0.7	0.201	< 0.697	< 1.2	< 0.196
Bromomethane		0.378	20.1	5.582	0.43	22.7	6.477	< 0.015	0.8	0.232	< 14.6	< 24.7	< 4.10
Chloroethane		0.750	39.9	11.075	0.43	22.7	6.477	0.46	25.3	7.103	29.3	49.7	8.22
Trichlorofluoromethane (FREON 11)		< 0.010	0.5	0.148	< 0.010	0.5	0.151	< 0.010	0.5	0.154	< 0.537	< 0.9	< 0.151
Acetone (2-Propanone)		5.94	316.0	87.714	6.34	335.0	95.500	7.21	396.0	111.332	348.991	591.5	98.2
1,1-Dichloroethylene		< 0.011	0.6	0.162	< 0.011	0.6	0.166	< 0.011	0.6	0.170	< 0.590	< 1.0	< 0.166
Methylene Chloride(Dichloromethane)		< 0.019	1.0	0.281	< 0.019	1.0	0.286	< 0.019	1.0	0.293	< 1.02	< 1.7	< 0.287
1,1-Dichloroethane		< 0.012	0.6	0.177	< 0.012	0.6	0.181	< 0.012	0.7	0.185	< 0.644	< 1.1	< 0.181
trans-1,2-Dichloroethylene		< 0.010	0.5	0.148	< 0.010	0.5	0.151	< 0.010	0.5	0.154	< 0.537	< 0.9	< 0.151
cis-1,2-Dichloroethylene		< 0.010	0.5	0.148	< 0.010	0.5	0.151	< 0.010	0.5	0.154	< 0.537	< 0.9	< 0.151
Chloroform		< 0.011	0.6	0.162	< 0.011	0.6	0.166	< 0.011	0.6	0.170	< 0.590	< 1.0	< 0.166
1,2-Dichloroethane		< 0.0070	0.4	0.103	< 0.0070	0.4	0.105	< 0.0070	0.4	0.108	< 0.376	< 0.6	< 0.106
Methyl Ethyl Ketone (2-Butanone)		< 0.036	1.9	0.532	< 0.036	1.9	0.542	< 0.036	2.0	0.556	< 1.93	< 3.3	< 0.543
1,1,1-Trichloroethane		< 0.014	0.7	0.207	< 0.014	0.7	0.211	< 0.014	0.8	0.216	< 0.751	< 1.3	< 0.211
Carbon Tetrachloride		< 0.016	0.9	0.236	< 0.016	0.8	0.241	< 0.016	0.9	0.247	< 0.858	< 1.5	< 0.241
Benzene		6.78	360.7	100.118	19.4	1025.2	292.224	21.900	1202.7	338.165	863	1462.5	244
1,1,2-Trichloroethane		< 0.016	0.9	0.236	< 0.016	0.8	0.241	< 0.016	0.9	0.247	< 0.858	< 1.5	< 0.241
1,2-Dichloropropane		< 0.011	0.6	0.162	< 0.011	0.6	0.166	< 0.011	0.6	0.170	< 0.590	< 1.0	< 0.166
Trichloroethylene		< 0.011	0.6	0.162	< 0.011	0.6	0.166	< 0.011	0.6	0.170	< 0.590	< 1.0	< 0.166
Bromodichloromethane		< 0.011	0.6	0.162	< 0.011	0.6	0.166	< 0.011	0.6	0.170	< 0.590	< 1.0	< 0.166
Dibromochloromethane		< 0.0090	0.5	0.133	< 0.0090	0.5	0.136	< 0.0090	0.5	0.139	< 0.483	< 0.8	< 0.136
Toluene		2.88	153.2	42.528	12.2	644.7	183.769	12.6	692.0	194.561	497	841.7	140
Ethylene Dibromide		< 0.010	0.5	0.148	< 0.010	0.5	0.151	< 0.010	0.5	0.154	< 0.537	< 0.9	< 0.151
Tetrachloroethylene		< 0.018	1.0	0.266	< 0.018	1.0	0.271	< 0.018	1.0	0.278	< 0.966	< 1.6	< 0.272
Chlorobenzene		0.393	20.9	5.803	0.33	17.4	4.971	0.39	21.4	6.022	19.9	33.8	5.60
1,1,1,2-Tetrachloroethane		< 0.010	0.5	0.148	< 0.010	0.5	0.151	< 0.010	0.5	0.154	< 0.537	< 0.9	< 0.151
Ethylbenzene		1.42	75.5	20.969	2.36	124.7	35.549	2.62	143.9	40.456	115	194.4	32.3
m / p-Xylene		4.49	238.8	66.302	9.38	495.7	141.292	10.4	571.1	160.590	435	737.7	123
Styrene		1.48	78.7	21.855	2.42	127.9	36.453	2.87	157.6	44.317	121	205.8	34.2
o-Xylene		1.77	94.2	26.137	3.75	198.2	56.487	4.01	220.2	61.920	171	289.6	48.2
Bromoform		< 0.014	0.7	0.207	< 0.014	0.7	0.211	< 0.014	0.8	0.216	< 0.751	< 1.3	< 0.211
1,1,2,2-Tetrachloroethane		< 0.014	0.7	0.207	< 0.014	0.7	0.211	< 0.014	0.8	0.216	< 0.751	< 1.3	< 0.211
1,3-Butadiene		4.410	234.6	65.121	4.440	234.6	66.880	4.420	242.7	68.251	237	402.2	66.8
Trichlorotrifluoroethane		< 0.025	1.3	0.369	< 0.500	26.4	7.532	< 0.500	27.5	7.721	< 18.4	< 31.2	< 5.21
Mesitylene		12.790	680.4	188.866	12.750	673.8	192.054	12.750	700.2	196.877	685	1160.6	193
Cumene		11.990	637.8	177.052	< 0.500	26.4	7.532	< 0.500	27.5	7.721	< 231	< 390.8	< 64.1

<u>Notes:</u>

' < ' indicates that the laboratory results were less than the Reportable Detection Limit (RDL). This RDL was used to calculate the concentration and emission rate.

[1] Sample volume, volumetric flow rate, and concentration based on dry referenced conditions (101.3 kPa, 25 °C, and Actual Oxygen)

[2] Average of the measured volumetric flow rates from isokinetic testing that day

Volatile Organic Compound Sampling

Main Stack Baseline

Facility:	St. Marys	**Operator:**	JDF
City:	Bowmanville	**Entered by:**	TFL
Source:	Main Stack Baseline	**Checked by:**	KNE
Run:	Test #1	**Test Date:**	September 30, 2018
Method:	VOST	**PBar:**	29.9
		DGM Y:	1.013

Time (min)	**Orifice Press.** ("H_2O)	**Meter Volume** (L)	**Meter Temp** (^oF)	**Vacuum** (in Hg)	**Probe Temp** (^oF)	**Condenser Temp** (°F)	**Sampling Rate** (L/min)
Pair 1 ID = 9							
12:10PM-1:10PM				Pre-test Leak Check:	<0.01 at 15"	Good	
0	0.6	0.00	59	-2.5	257	57	0.3
20	0.6	6.12	59	-3.5	259	52	0.3
40	0.6	12.03	60	-3.5	257	48	0.3
60	0.6	17.92	60	-3.5	257	52	0.3
				Post-test Leak Check:	<0.01 at 3.5"	Good	
Average	0.6		60	-3.3	258		0.30
Total Volume Actual (m^3)		0.018					
Total Volume Reference (Rm^3)		**0.019**					

Volatile Organic Compound Sampling

Main Stack Baseline

Facility:	St. Marys	**Operator:**	JDF
City:	Bowmanville	**Entered by:**	TFL
Source:	Main Stack Baseline	**Checked by:**	KNE
Run:	Test #2	**Test Date:**	October 1, 2018
Method:	VOST	**PBar:**	29.9
		Y:	1.013

Time (min)	**Orifice Press.** ("H_2O)	**Meter Volume** (L)	**Meter Temp** (^oF)	**Vacuum** (in Hg)	**Probe Temp** (^oF)	**Condensor Temp** (°F)	**Sampling Rate** (L/min)
Pair 2 ID = 8							
1:20PM - 2:20PM				Pre-test Leak Check:	<0.01 at 13"	Good	
0	0.6	0.00	62	-2.5	257	59	0.3
20	0.6	6.12	63	-3.0	259	55	0.3
40	0.6	11.92	64	-3.0	257	52	0.3
60	0.6	18.16	63	-3.0	257	52	0.3
				Post-test Leak Check:	<0.01 at 3" H	Good	
Average	0.6		63	-2.9	258		0.31
Total Volume Actual (m^3)		0.018					
Total Volume Reference (Rm^3)		**0.019**					

Volatile Organic Compound Sampling

Main Stack Baseline

Facility:	St. Marys	**Operator:**	JDF
City:	Bowmanville	**Entered by:**	TFL
Source:	Main Stack Baseline	**Checked by:**	KNE
Run:	Test #3	**Test Date:**	October 2, 2018
Method:	VOST	**PBar:**	29.9
		Y:	1.013

Time (min)	**Orifice Press.** ("H_2O)	**Meter Volume** (L)	**Meter Temp** (^oF)	**Vacuum** (in Hg)	**Probe Temp** (^oF)	**Condensor Temp** (°F)	**Sampling Rate** (L/min)
Pair 3 ID = 7							
2:30PM - 3:30PM				Pre-test Leak Check:	<0.01 at 15"	Good	
0	0.6	0.00	63	-2.0	259	59	0.3
20	0.6	6.23	63	-3.0	257	57	0.3
40	0.6	12.12	63	-3.0	258	52	0.3
60	0.6	17.47	63	-3.0	258	52	0.3
				Post-test Leak Check:	<0.01 at 3" H	Good	
Average	0.6		63	-2.8	258		0.29
Total Volume Actual (m^3)		0.017					
Total Volume Reference (Rm^3)		**0.018**					

Volatile Organic Compound Sampling

Main Stack - Alt Fuels

Units		Test #1			Test #2			Test #3			Average	
Sample ID :		Pair 1 ID = 8			Pair 2 ID = 9			Pair 3 ID = 1				
Sampling Date :	-	Oct 10, 18			Oct 12, 18			Oct 12, 18			-	
Sampling Times :	-	11:55AM-12:55PM			8:50AM - 9:50AM			2:20PM - 3:20PM			-	
Sample Volume[1] :	Rm^3	0.017			0.018			0.018			0.018	
Stack Flow Rate[1], [2]	Rm^3/s	275			275			271			273.8	
	Lab Data (µg)	**Conc** (µg/m^3)	**Emission Rate** (mg/s)	**Lab Data** (µg)	**Conc** (µg/m^3)	**Emission Rate** (mg/s)	**Lab Data** (µg)	**Conc** (µg/m^3)	**Emission Rate** (mg/s)	**Conc** (µg)	**Conc. Corrected to 11% O_2 [3]** (µg/m3)	**Emission Rate** (mg/s)
Chloromethane	5.72	334	92	3.60	199	54.9	3.51	192	52.2	242	424	66.3
Vinyl Chloride	0.165	9.63	2.65	< 0.013	0.720	0.198	< 0.013	0.712	0.193	< 3.69	< 6.47	< 1.01
Bromomethane	0.215	12.5	3.45	< 0.015	0.830	0.229	< 0.015	0.822	0.223	< 4.73	< 8.31	< 1.30
Chloroethane	0.632	36.9	10.1	0.39	21.6	5.94	0.59	32.3	8.77	30.3	53.1	8.28
Acetone (2-Propanone)	7.71	450	124	5.7	316	86.9	3.7	203	55.0	323	566	88.5
1,1-Dichloroethylene	< 0.011	0.642	0.176	< 0.011	0.609	0.168	< 0.011	0.603	0.163	< 0.618	< 1.08	< 0.169
Methylene Chloride(Dichloromethane)	< 0.019	1.109	0.305	< 0.019	1.052	0.290	< 0.019	1.041	0.282	< 1.067	< 1.87	< 0.292
1,1-Dichloroethane	< 0.012	0.700	0.193	< 0.012	0.664	0.183	< 0.012	0.658	0.178	< 0.674	< 1.18	< 0.185
trans-1,2-Dichloroethylene	< 0.010	0.584	0.160	< 0.010	0.554	0.152	< 0.010	0.548	0.149	< 0.562	< 0.99	< 0.154
cis-1,2-Dichloroethylene	< 0.010	0.584	0.160	< 0.010	0.554	0.152	< 0.010	0.548	0.149	< 0.562	< 0.99	< 0.154
Chloroform	< 0.011	0.642	0.176	< 0.011	0.609	0.168	< 0.011	0.603	0.163	< 0.618	< 1.08	< 0.169
1,2-Dichloroethane	< 0.0070	0.409	0.112	< 0.0070	0.388	0.107	< 0.0070	0.384	0.104	< 0.393	< 0.69	< 0.108
Methyl Ethyl Ketone (2-Butanone)	< 0.036	2.101	0.578	< 0.036	1.993	0.549	< 0.036	1.973	0.535	< 2.022	< 3.55	< 0.554
1,1,1-Trichloroethane	< 0.014	0.817	0.225	< 0.014	0.775	0.213	< 0.014	0.767	0.208	< 0.786	< 1.38	< 0.215
Carbon Tetrachloride	< 0.016	0.934	0.257	< 0.016	0.886	0.244	< 0.016	0.877	0.238	< 0.899	< 1.58	< 0.246
Benzene	7.29	426	117	22.4	1240	341	19.9	1090	296	919	1612	251
1,1,2-Trichloroethane	< 0.016	0.934	0.257	< 0.016	0.886	0.244	< 0.016	0.877	0.238	< 0.899	< 1.58	< 0.246
1,2-Dichloropropane	< 0.011	0.642	0.176	< 0.011	0.609	0.168	< 0.011	0.603	0.163	< 0.618	< 1.08	< 0.169
Trichloroethylene	< 0.011	0.642	0.176	< 0.011	0.609	0.168	< 0.011	0.603	0.163	< 0.618	< 1.08	< 0.169
Bromodichloromethane	< 0.011	0.642	0.176	< 0.011	0.609	0.168	< 0.011	0.603	0.163	< 0.618	< 1.08	< 0.169
Dibromochloromethane	< 0.0090	0.525	0.144	< 0.0090	0.498	0.137	< 0.0090	0.493	0.134	< 0.506	< 0.89	< 0.138
Toluene	3.51	205	56.3	13.5	747	206	13.6	745	202	566	993	155
Ethylene Dibromide	< 0.010	0.584	0.160	< 0.010	0.554	0.152	< 0.010	0.548	0.149	< 0.562	< 0.99	< 0.154
Tetrachloroethylene	< 0.018	1.051	0.289	< 0.018	0.996	0.274	< 0.018	0.986	0.268	< 1.011	< 1.77	< 0.277
Chlorobenzene	0.518	30.2	8.31	0.46	25.5	7.01	0.46	25.2	6.84	27.0	47.3	7.39
1,1,1,2-Tetrachloroethane	< 0.010	0.6	0.160	< 0.010	0.554	0.152	< 0.010	0.548	0.149	< 0.562	< 0.986	< 0.154
Ethylbenzene	1.60	93.4	25.7	2.58	143	39.3	2.72	149	40.4	128	225	35.1
m / p-Xylene	5.51	322	88.4	10.7	592	163	11.4	625	169	513	900	140
Styrene	1.87	109	30.0	2.92	162	44.5	2.85	156	42.4	142	250	39.0
o-Xylene	2.11	123	33.8	4.04	224	61.6	4.41	242	65.5	196	344	53.7
Bromoform	< 0.014	0.817	0.225	< 0.014	0.775	0.213	< 0.014	0.767	0.208	< 0.786	< 1.38	< 0.215
1,1,2,2-Tetrachloroethane	< 0.014	0.817	0.225	< 0.014	0.775	0.213	< 0.014	0.767	0.208	< 0.786	< 1.38	< 0.215
Cumene	0.270	15.8	4.33	< 1.000	55.4	15.2	< 1.000	54.8	14.86	< 42.0	< 73.6	< 11.5

Notes:

' < ' indicates that the laboratory results were less than the Reortable Detection Limit (RDL). This RDL was used to calculate the concentration and emission rate.

[1] Sample volume, volumetric flow rate, and concentration based on dry referenced conditions (101.3 kPa, 25 °C, and Actual Oxygen)

[2] Average of the measured volumetric flow rates from isokinetic testing that day

Volatile Organic Compound Sampling

Main Stack - Alt Fuels

Facility:	SMC	**Operator:**	MP
City:	Bowmanville, Ontario	**Entered by:**	TFL
Source:	Main Stack Alt Fuels	**Checked by:**	KNE
Run:	Test #1	**Test Date:**	October 10, 2018
Method:	VOST	**PBar:**	29.4
		DGM Y:	1.013

Time (min)	**Orifice Press.** ("H_2O)	**Meter Volume** (L)	**Meter Temp** (^oF)	**Vacuum** (in Hg)	**Probe Temp** (^oF)	**Condenser Temp** (°F)	**Sampling Rate** (L/min)
Pair 1 ID = 8							
11:55AM-12:55PM				Pre-test Leak Check:	<0.01 at 15"	Good	
0	0.6	0.00	86	-2.0	125	72	0.30
20	0.6	5.92	86	-2.5	126	63	0.29
40	0.6	11.72	86	-2.5	126	63	0.29
60	0.6	17.47	86	-3.0	125	74	
				Post-test Leak Check:	<0.01 at 3" H	Good	
Average	0.6		86	-2.5	126		0.29
Total Volume Actual (m^3)		0.017					
Total Volume Reference (Rm^3)		**0.017**					

Volatile Organic Compound Sampling

Main Stack - Alt Fuels

Facility:	SMC	**Operator:**	MP
City:	Bowmanville, Ontario	**Entered by:**	TFL
Source:	Main Stack Alt Fuels	**Checked by:**	KNE
Run:	Test #2	**Test Date:**	October 12, 2018
Method:	VOST	**PBar:**	29.3
		Y:	1.013

Time (min)	**Orifice Press.** ("H_2O)	**Meter Volume** (L)	**Meter Temp** (^oF)	**Vacuum** (in Hg)	**Probe Temp** (^oF)	**Condensor Temp** (°F)	**Sampling Rate** (L/min)
Pair 2 ID = 9							
8:50AM - 9:50AM				Pre-test Leak Check:	<0.01 at 15"	Good	
0	0.6	0.00	82	-2.0	125	68	0.31
20	0.6	6.23	83	-2.5	125	59	0.30
40	0.6	12.30	83	-2.5	125	59	0.30
60	0.6	18.38	83	-2.5	126	61	
				Post-test Leak Check:	<0.01 at 3" H	Good	
Average	0.6		83	-2.4	125		0.31
Total Volume Actual (m^3)		0.018					
Total Volume Reference (Rm^3)		**0.018**					

Volatile Organic Compound Sampling

Main Stack - Alt Fuels

Facility:	SMC	**Operator:**	MP
City:	Bowmanville, Ontario	**Entered by:**	TFL
Source:	Main Stack Alt Fuels	**Checked by:**	KNE
Run:	Test #3	**Test Date:**	October 12, 2018
Method:	VOST	**PBar:**	29.3
		Y:	0.996

Time (min)	**Orifice Press.** ("H_2O)	**Meter Volume** (L)	**Meter Temp** (^oF)	**Vacuum** (in Hg)	**Probe Temp** (^oF)	**Condensor Temp** (°F)	**Sampling Rate** (L/min)
Pair 3 ID = 1							
2:20PM - 3:20PM				Pre-test Leak Check:	<0.01 at 15"	Good	
0	0.6	0.00	79	-2.0	126	61	0.31
20	0.6	6.12	79	-2.5	125	55	0.31
40	0.6	12.35	79	-2.5	125	54	0.32
60	0.6	18.75	79	-2.5	126	54	
				Post-test Leak Check:	<0.01 at 3" H	Good	
Average	0.6		79	-2.4	126		0.31
Total Volume Actual (m^3)		0.019					
Total Volume Reference (Rm^3)		**0.018**					

Volatile Organic Compound Sampling

Main Stack Alt Fuels

Units	Test #1			Test #2			Test #3			Average		
Sample ID :	Pair 1 ID = 1			Pair 2 ID = 8			Pair 3 ID = 10					
Sampling Date : -	Dec 4, 18			Dec 5, 18			Dec 6, 18			-		
Sampling Times : -	1:35PM-2:35PM			10:15AM - 11:15AM			11:25AM - 12:25PM			-		
Sample Volume[1] : Rm^3	0.021			0.020			0.019			0.020		
Stack Flow Rate[1], [2] Rm^3/s	288			285			282			285.3		
	Lab Data (µg)	**Conc** (µg/m^3)	**Emission Rate** (mg/s)	**Lab Data** (µg)	**Conc** (µg/m^3)	**Emission Rate** (mg/s)	**Lab Data** (µg)	**Conc** (µg/m^3)	**Emission Rate** (mg/s)	**Conc** (µg)	**Conc. Corrected to 11% O_2** [3] (µg/m3)	**Emission Rate** (mg/s)
Chloromethane	3.58	168	48.4	7.79	396	113	7.68	398	112	320	416	91.2
Vinyl Chloride	0.128	6.00	1.73	< 0.013	0.660	0.188	< 0.013	0.673	0.190	< 2.44	< 3.17	< 0.703
Bromomethane	0.332	15.6	4.49	1.13	57.4	16.36	0.86	44.5	12.6	39.2	50.9	11.1
Chloroethane	0.898	42.1	12.1	0.44	22.4	6.37	0.56	29.0	8.19	31.1	40.4	8.90
Acetone (2-Propanone)	10.7	502	145	7.1	361	103	8.3	430	121	431	559	123
1,1-Dichloroethylene	< 0.011	0.516	0.149	< 0.011	0.559	0.159	< 0.011	0.569	0.161	< 0.548	< 0.712	< 0.156
Methylene Chloride(Dichloromethane)	< 0.019	0.891	0.257	< 0.019	0.965	0.275	< 0.019	0.984	0.278	< 0.946	< 1.229	< 0.270
1,1-Dichloroethane	< 0.012	0.563	0.162	< 0.012	0.610	0.174	< 0.012	0.621	0.175	< 0.598	< 0.776	< 0.170
trans-1,2-Dichloroethylene	< 0.010	0.469	0.135	< 0.010	0.508	0.145	< 0.010	0.518	0.146	< 0.498	< 0.647	< 0.142
cis-1,2-Dichloroethylene	< 0.010	0.469	0.135	< 0.010	0.508	0.145	< 0.010	0.518	0.146	< 0.498	< 0.647	< 0.142
Chloroform	< 0.011	0.516	0.149	< 0.011	0.559	0.159	< 0.011	0.569	0.161	< 0.548	< 0.712	< 0.156
1,2-Dichloroethane	< 0.0070	0.328	0.095	< 0.0070	0.356	0.101	< 0.0070	0.362	0.102	< 0.349	< 0.453	< 0.099
Methyl Ethyl Ketone (2-Butanone)	< 0.036	1.688	0.487	< 0.036	1.829	0.521	< 0.036	1.864	0.526	< 1.793	< 2.329	< 0.511
1,1,1-Trichloroethane	< 0.014	0.656	0.189	< 0.014	0.711	0.203	< 0.014	0.725	0.205	< 0.697	< 0.906	< 0.199
Carbon Tetrachloride	< 0.016	0.750	0.216	< 0.016	0.813	0.232	< 0.016	0.828	0.234	< 0.797	< 1.035	< 0.227
Benzene	7.76	364	105	19.7	1001	285	24.1	1248	352	871	1131	248
1,1,2-Trichloroethane	< 0.016	0.750	0.216	< 0.016	0.813	0.232	< 0.016	0.828	0.234	< 0.797	< 1.035	< 0.227
1,2-Dichloropropane	< 0.011	0.516	0.149	< 0.011	0.559	0.159	< 0.011	0.569	0.161	< 0.548	< 0.712	< 0.156
Trichloroethylene	< 0.011	0.516	0.149	< 0.011	0.559	0.159	< 0.011	0.569	0.161	< 0.548	< 0.712	< 0.156
Bromodichloromethane	< 0.011	0.516	0.149	< 0.011	0.559	0.159	< 0.011	0.569	0.161	< 0.548	< 0.712	< 0.156
Dibromochloromethane	< 0.0090	0.422	0.122	< 0.0090	0.457	0.130	< 0.0090	0.466	0.132	< 0.448	< 0.582	< 0.128
Toluene	3.53	165	47.7	13.1	665	190	16.8	870	246	567	736	161
Ethylene Dibromide	< 0.010	0.469	0.135	< 0.010	0.508	0.145	< 0.010	0.518	0.146	< 0.50	< 0.647	< 0.142
Tetrachloroethylene	< 0.018	0.844	0.243	< 0.018	0.914	0.261	< 0.018	0.932	0.263	< 0.90	< 1.16	< 0.256
Chlorobenzene	0.721	33.8	9.75	0.46	23.4	6.66	0.57	29.5	8.33	28.9	37.5	8.25
1,1,1,2-Tetrachloroethane	< 0.010	0.469	0.135	< 0.010	0.508	0.145	< 0.010	0.518	0.146	< 0.498	< 0.647	< 0.142
Ethylbenzene	1.96	91.9	26.5	2.59	132	37.5	3.28	170	48.0	131	170	37.3
m / p-Xylene	6.34	297	85.7	11.7	594	169	14.6	756	213	549	713	156
Styrene	1.62	75.9	21.90	1.93	98.0	27.9	2.60	135	38.0	103	134	29.3
o-Xylene	2.57	120	34.8	4.45	226	64.4	5.64	292	82.5	213	276	60.5
Bromoform	< 0.014	0.656	0.189	< 0.014	0.711	0.203	< 0.014	0.725	0.205	< 0.697	< 0.906	< 0.199
1,1,2,2-Tetrachloroethane	< 0.014	0.656	0.189	< 0.014	0.711	0.203	< 0.014	0.725	0.205	< 0.697	< 0.906	< 0.199
Cumene	0.300	14.1	4.06	< 1.000	50.8	14.5	< 1.000	51.8	14.6	< 38.9	< 50.5	< 11.1

Notes:

Notes:

' < ' indicates that the laboratory results were less than the Reortable Detection Limit (RDL). This RDL was used to calculate the concentration and emission rate.

[1] Sample volume, volumetric flow rate, and concentration based on dry referenced conditions (101.3 kPa, 25 °C, and Actual Oxygen)

[2] Average of the measured volumetric flow rates from isokinetic testing that day

Volatile Organic Compound Sampling

Main Stack Alt Fuels

Facility:	SMC	**Operator:**	JDF
City:	Bowmanville, Ontario	**Entered by:**	TFL
Source:	Main Stack Alt Fuels	**Checked by:**	KNE
Run:	Test #1	**Test Date:**	December 4, 2018
Method:	VOST	**PBar:**	29.5
		DGM Y:	1.013

Time (min)	**Orifice Press.** ("H_2O)	**Meter Volume** (L)	**Meter Temp** (^oF)	**Vacuum** (in Hg)	**Probe Temp** (^oF)	**Condenser Temp** (°F)	**Sampling Rate** (L/min)
Pair 1 ID = 1							
1:35PM-2:35PM				Pre-test Leak Check:	<0.01 at 15"	Good	
0	0.6	0.00	46	-2.0	250	52	0.3
20	0.6	6.45	44	-3.0	250	46	0.3
40	0.6	13.22	44	-3.0	251	44	0.3
60	0.6	20.03	43	-3.0	250	43	
				Post-test Leak Check:	<0.01 at 3" H	Good	
Average	0.6		44	-2.8	250		0.33
Total Volume Actual (m^3)		0.020					
Total Volume Reference (Rm^3)		**0.021**					

Volatile Organic Compound Sampling

Main Stack Alt Fuels

Facility:	SMC	**Operator:**	JDF
City:	Bowmanville, Ontario	**Entered by:**	TFL
Source:	Main Stack Alt Fuels	**Checked by:**	KNE
Run:	Test #2	**Test Date:**	December 5, 2018
Method:	VOST	**PBar:**	29.5
		Y:	1.013

Time (min)	**Orifice Press.** ("H_2O)	**Meter Volume** (L)	**Meter Temp** (°F)	**Vacuum** (in Hg)	**Probe Temp** (°F)	**Condensor Temp** (°F)	**Sampling Rate** (L/min)
Pair 2 ID = 8							
10:15AM - 11:15AM				Pre-test Leak Check:	<0.01 at 15"	Good	
0	0.6	0.00	43	-2.5	250	43	0.3
20	0.6	5.91	43	-3.0	251	44	0.3
40	0.6	11.82	44	-3.0	251	43	0.3
60	0.6	18.45	44	-3.0	251	44	
				Post-test Leak Check:	<0.01 at 3" H	Good	
Average	0.6		44	-2.9	251		0.31
Total Volume Actual (m^3)		0.018					
Total Volume Reference (Rm^3)		**0.020**					

Volatile Organic Compound Sampling

Main Stack Alt Fuels

Facility:	SMC	**Operator:**	JDF
City:	Bowmanville, Ontario	**Entered by:**	TFL
Source:	Main Stack Alt Fuels	**Checked by:**	KNE
Run:	Test #3	**Test Date:**	December 6, 2018
Method:	VOST	**PBar:**	29.5
		Y:	1.013

Time (min)	**Orifice Press.** ("H_2O)	**Meter Volume** (L)	**Meter Temp** (^oF)	**Vacuum** (in Hg)	**Probe Temp** (^oF)	**Condensor Temp** (°F)	**Sampling Rate** (L/min)
Pair 3 ID = 10							
11:25AM - 12:25PM			Pre-test Leak Check:	<0.01 at 15" Hg	Good		
0	0.6	0.00	46	-2.0	250	46	0.3
20	0.6	6.00	46	-3.0	250	46	0.3
40	0.6	12.23	48	-3.0	249	46	0.3
60	0.6	18.23	48	-3.0	250	46	
			Post-test Leak Check:	<0.01 at 3" Hg	Good		
Average	0.6		47	-2.8	250		0.30
Total Volume Actual (m^3)		0.018					
Total Volume Reference (Rm^3)		**0.019**					

Volatile Organic Compound Sampling

Main Stack Baseline

	Units	**Test #1**			**Test #2**			**Test #3**			**Average**		
Sample ID :		Pair 1 ID = 5			Pair 2 ID = 3			Pair 3 ID = 6					
Sampling Date :	-	Dec 7, 18			Dec 7, 18			Dec 8, 18			-		
Sampling Times :	-	9:55AM-10:55PM			2:40PM - 3:40PM			8:50AM - 9:50AM			-		
Sample Volume[1] :	Rm^3	0.018			0.024			0.020			0.021		
Stack Flow Rate[1], [2]	Rm^3/s	288			295			285			289		
		Lab Data (µg)	**Conc** ($\mu g/m^3$)	**Emission Rate** (mg/s)	**Lab Data** (µg)	**Conc** ($\mu g/m^3$)	**Emission Rate** (mg/s)	**Lab Data** (µg)	**Conc** ($\mu g/m^3$)	**Emission Rate** (mg/s)	**Conc** (µg)	**Conc. Corrected to 11% O_2 [3]** (µg/m3)	**Emission Rate** (mg/s)
Chloromethane		8.00	451	130	6.96	295	87.2	6.42	316	90.3	354	506	102
Vinyl Chloride		< 0.013	0.732	0.211	< 0.013	0.552	0.163	< 0.013	0.641	0.183	< 0.642	< 0.916	< 0.185
Bromomethane		0.76	42.8	12.3	0.62	26.3	7.76	< 0.015	0.739	0.211	< 23.3	< 33.3	< 6.76
Chloroethane		0.71	40.0	11.5	0.54	22.9	6.76	0.60	29.6	8.44	30.8	44.0	8.90
Acetone (2-Propanone)		5.6	315	90.8	5.2	221	65.1	6.1	301	85.8	279	398	80.6
1,1-Dichloroethylene		< 0.011	0.619	0.178	< 0.011	0.467	0.138	< 0.011	0.542	0.155	< 0.543	< 0.775	< 0.157
Methylene Chloride(Dichloromethane)		< 0.019	1.070	0.308	< 0.019	0.806	0.238	< 0.019	0.936	0.267	< 0.938	< 1.339	< 0.271
1,1-Dichloroethane		< 0.012	0.676	0.195	< 0.012	0.509	0.150	< 0.012	0.591	0.169	< 0.592	< 0.846	< 0.171
trans-1,2-Dichloroethylene		< 0.010	0.563	0.162	< 0.010	0.424	0.125	< 0.010	0.493	0.141	< 0.493	< 0.705	< 0.143
cis-1,2-Dichloroethylene		< 0.010	0.563	0.162	< 0.010	0.424	0.125	< 0.010	0.493	0.141	< 0.493	< 0.705	< 0.143
Chloroform		< 0.011	0.619	0.178	< 0.011	0.467	0.138	< 0.011	0.542	0.155	< 0.543	< 0.775	< 0.157
1,2-Dichloroethane		< 0.0070	0.394	0.113	< 0.0070	0.297	0.088	< 0.0070	0.345	0.098	< 0.345	< 0.493	< 0.100
Methyl Ethyl Ketone (2-Butanone)		< 0.036	2.027	0.584	< 0.036	1.528	0.451	< 0.036	1.774	0.506	< 1.777	< 2.538	< 0.514
1,1,1-Trichloroethane		< 0.014	0.788	0.227	< 0.014	0.594	0.175	< 0.014	0.690	0.197	< 0.691	< 0.987	< 0.200
Carbon Tetrachloride		< 0.016	0.901	0.259	< 0.016	0.679	0.200	< 0.016	0.789	0.225	< 0.790	< 1.128	< 0.228
Benzene		21.7	1222	352	16.8	713	210	19.2	946	270	960	1372	277
1,1,2-Trichloroethane		< 0.016	0.901	0.259	< 0.016	0.679	0.200	< 0.016	0.789	0.225	< 0.790	< 1.128	< 0.228
1,2-Dichloropropane		< 0.011	0.619	0.178	< 0.011	0.467	0.138	< 0.011	0.542	0.155	< 0.543	< 0.775	< 0.157
Trichloroethylene		< 0.011	0.619	0.178	< 0.011	0.467	0.138	< 0.011	0.542	0.155	< 0.543	< 0.775	< 0.157
Bromodichloromethane		< 0.011	0.619	0.178	< 0.011	0.467	0.138	< 0.011	0.542	0.155	< 0.543	< 0.775	< 0.157
Dibromochloromethane		< 0.0090	0.507	0.146	< 0.0090	0.382	0.113	< 0.0090	0.444	0.127	< 0.444	< 0.634	< 0.128
Toluene		16.3	918	264	12.4	526	155	14.5	715	204	720	1028	208
Ethylene Dibromide		< 0.010	0.563	0.162	< 0.010	0.424	0.125	< 0.010	0.493	0.141	< 0.493	< 0.705	< 0.143
Tetrachloroethylene		< 0.018	1.014	0.292	< 0.018	0.764	0.225	< 0.018	0.887	0.253	< 0.888	< 1.27	< 0.257
Chlorobenzene		0.53	29.8	8.59	< 0.011	0.467	0.138	0.49	24.2	6.89	< 18.2	< 25.9	< 5.21
1,1,1,2-Tetrachloroethane		< 0.010	0.563	0.162	< 0.010	0.424	0.125	< 0.010	0.493	0.141	< 0.493	< 0.705	< 0.143
Ethylbenzene		3.11	175	50.4	2.41	102	30.2	2.76	136	38.8	138	197	39.8
m / p-Xylene		14.6	822	237	11.4	484	143	13.0	641	183	649	927	187
Styrene		2.88	162	46.7	2.70	115	33.8	2.74	135	38.5	137	196	39.7
o-Xylene		5.61	316	90.9	4.25	180	53.2	4.94	243	69.5	247	352	71.2
Bromoform		< 0.014	0.788	0.227	< 0.014	0.594	0.175	< 0.014	0.690	0.197	< 0.691	< 0.987	< 0.200
1,1,2,2-Tetrachloroethane		< 0.014	0.788	0.227	< 0.014	0.594	0.175	< 0.014	0.690	0.197	< 0.691	< 0.987	< 0.200
Cumene		< 1.000	56.3	16.2	< 1.000	42.4	12.5	< 1.000	49.3	14.1	< 49.3	< 70.5	< 14.3

__Notes:__

' < ' indicates that the laboratory results were less than the Reortable Detection Limit (RDL). This RDL was used to calculate the concentration and emission rate.

[1] Sample volume, volumetric flow rate, and concentration based on dry referenced conditions (101.3 kPa, 25 °C, and Actual Oxygen)

[2] Average of the measured volumetric flow rates from isokinetic testing that day

Volatile Organic Compound Sampling

Main Stack Baseline

Facility:	SMC	**Operator:**	MP
City:	Bowmanville, Ontario	**Entered by:**	TFL
Source:	Main Stack Baseline	**Checked by:**	KNE
Run:	Test #1	**Test Date:**	December 7, 2018
Method:	VOST	**PBar:**	29.9
		DGM Y:	1.013

Time (min)	**Orifice Press.** ("H_2O)	**Meter Volume** (L)	**Meter Temp** (^oF)	**Vacuum** (in Hg)	**Probe Temp** (^oF)	**Sampling Rate** (L/min)
Pair 1 ID = 5						
9:55AM-10:55PM				Pre-test Leak Check:	<0.01 at 15" Hg	
0	0.6	0.00	36	-2.0	251	0.268
20	0.6	5.36	35	-2.0	252	0.274
40	0.5	10.83	35	-2.0	249	0.267
60	0.4	16.17	36	-3.0	250	
				Post-test Leak Check:	<0.01 at 3" Hg	
Average	0.5		36	-2.3	251	0.27
Total Volume Actual (m^3)		0.016				
Total Volume Reference (Rm^3)		**0.018**				

Volatile Organic Compound Sampling

Main Stack Baseline

Facility:	SMC	**Operator:**	MP
City:	Bowmanville, Ontario	**Entered by:**	TFL
Source:	Main Stack Baseline	**Checked by:**	KNE
Run:	Test #2	**Test Date:**	December 7, 2018
Method:	VOST	**PBar:**	29.9
		Y:	1.013

Time (min)	**Orifice Press.** ("H_2O)	**Meter Volume** (L)	**Meter Temp** (^oF)	**Vacuum** (in Hg)	**Probe Temp** (^oF)	**Sampling Rate** (L/min)
Pair 2 ID = 3						
2:40PM - 3:40PM				Pre-test Leak Check:	<0.01 at 15" Hg	
0	0.6	0.00	34	-2.0	248	0.355
20	0.6	7.11	34	-2.0	250	0.357
40	0.6	14.26	33	-2.0	250	0.354
60	0.6	21.35	32	-3.0	250	
				Post-test Leak Check:	<0.01 at 3" Hg	
Average	0.6		33	-2.3	250	0.36
Total Volume Actual (m^3)		0.021				
Total Volume Reference (Rm^3)		**0.024**				

Volatile Organic Compound Sampling

Main Stack Baseline

Facility:	SMC	**Operator:**	MP
City:	Bowmanville, Ontario	**Entered by:**	TFL
Source:	Main Stack Baseline	**Checked by:**	KNE
Run:	Test #3	**Test Date:**	December 8, 2018
Method:	VOST	**PBar:**	29.9
		Y:	1.013

Time (min)	**Orifice Press.** ("H_2O)	**Meter Volume** (L)	**Meter Temp** (^oF)	**Vacuum** (in Hg)	**Probe Temp** (^oF)	**Sampling Rate** (L/min)
Pair 3 ID = 6						
8:50AM - 9:50AM				Pre-test Leak Check:	<0.01 at 15" Hg	
0	0.6	0.00	32	-2.0	249	0.31
20	0.6	6.12	32	-2.0	248	0.31
40	0.6	12.25	32	-2.0	251	0.30
60	0.6	18.35	33	-2.0	250	
				Post-test Leak Check:	<0.01 at 3" Hg	
Average	0.6		32	-2.0	250	0.31
Total Volume Actual (m^3)		0.018				
Total Volume Reference (Rm^3)		**0.020**				

APPENDIX I

Dry Gas Meter Calibration Certificate

DGM Console ID: A
DGM Serial #:
Calibration Date: Aug 09, 18
Calibrated by TD

Barometric Pressure	760.71	mmHg
	101.42	kPa
Ambient T	21	°C
%r.H	45.00%	
W	0.0069488	lb/lb
B_{wo}	0.0111	ft³/ft³

LEAK CHECK	DGM (ft³)	WGM (L)
intial value	381.76	688.18
final value	381.90	692.77
time (1 min)	1	1
Pass/Fail	PASS	PASS

Dry Gas Meter Values									Wet Gas Meter Values										
Δ H	Δ H	Initial Vol.	Final Vol.	Volume (Vd)	Temp inlet	Temp outlet	Temp Avg (td)	Time	Δ M	Δ M	Initial Vol.	Final Vol.	Volume (Vw)	Temp inlet	Temp outlet	Temp (tw)	Calibration Factors		Tolerance
(in. H_2O)	(cm H_2O)	(ft³)	(ft³)	(m³)	(°F)	(°F)	(°C)	(min)	Pa	(cm H_2O)	(L)	(L)	(m³)	(°C)	(°C)	(°C)	Y	Δ $H_@$	Y (<±2%)
0.25	0.635	381.90	387.64	0.163	68	74	21.7	20	20	0.20	692.77	857.13	0.164	24	24	24	0.992	1.745	-0.1%
0.25	0.635	387.64	393.52	0.167	74	80	25.0	20	20	0.20	857.13	1024.76	0.168	24	24	24	0.999	1.659	0.6%
0.25	0.635	393.52	399.44	0.168	80	86	28.3	20	20	0.20	1024.76	1191.37	0.167	24	24	24	0.997	1.661	0.4%
0.5	1.270	399.44	407.77	0.236	86	87	30.3	20	20	0.20	1191.37	1424.85	0.233	24	24	24	0.999	1.683	0.6%
0.5	1.270	407.77	416.49	0.247	87	88	30.8	21	20	0.20	1424.85	1667.87	0.243	24	24	24	0.995	1.709	0.2%
0.5	1.270	416.49	424.76	0.234	88	89	31.4	20	20	0.20	1667.87	1898.37	0.231	24	24	24	0.997	1.720	0.4%
1	2.540	424.76	433.44	0.246	89	90	31.9	15	40	0.41	1898.37	2138.95	0.241	24	24	24	0.992	1.777	-0.1%
1	2.540	433.44	442.04	0.244	90	90	32.2	15	40	0.41	2138.95	2377.45	0.239	24	24	24	0.993	1.806	0.0%
1	2.540	442.04	451.33	0.263	90	92	32.8	16	40	0.41	2377.45	2633.97	0.257	24	24	24	0.991	1.773	-0.2%
2	5.080	451.33	461.10	0.277	92	92	33.3	12	60	0.61	2633.97	2903.96	0.270	24	24	24	0.991	1.806	-0.2%
2	5.080	461.10	470.71	0.272	78	79	25.8	12	60	0.61	2903.96	3176.83	0.273	23	23	23	0.997	1.800	0.4%
2	5.080	470.71	480.30	0.272	79	81	26.7	12	60	0.61	3176.83	3447.34	0.271	23	23	23	0.993	1.827	0.0%
4	10.160	480.30	491.59	0.320	81	84	28.1	10	80	0.82	3447.34	3764.03	0.317	23	23	23	0.987	1.860	-0.6%
4	10.160	491.59	502.88	0.320	84	84	28.9	10	80	0.82	3764.03	4080.05	0.316	23	23	23	0.988	1.862	-0.5%
4	10.160	502.88	518.69	0.448	84	85	29.2	14	80	0.82	4080.05	4521.17	0.441	23	23	23	0.986	1.872	-0.7%
																AVERAGE =	0.9930	1.7707	

Psychrometric Calculator
http://www.sugartech.co.za/psychro/index.php

How to use Pschrometic Calcutor
1) Dry Buld Temp = Ambient Temp of room
2) Select Relat. Humidity
3) Enter Relat. Humidity value
4) Calculate
5) Select IP Unit
6) W= Humidity Ratio

Dry Gas Meter Calibration Certificate

DGM Console ID: E
DGM Serial #:
Calibration Date: Aug 09, 18
Calibrated by JDF

Barometric Pressure	739.04	mmHg
	98.26	kPa
Ambient T	21	°C
%r.H	24.00%	
W	0.0032235	lb/lb
B_{wo}	0.0052	ft³/ft³

LEAK CHECK	DGM (ft³)	WGM (L)
intial value	677.32	245.22
final value	677.47	247.82
time (1 min)	1	1
Pass/Fail	PASS	PASS

Dry Gas Meter Values									Wet Gas Meter Values										
Δ H	Δ H	Initial Vol.	Final Vol.	Volume (Vd)	Temp inlet	Temp outlet	Temp Avg (td)	Time	Δ M	Δ M	Initial Vol.	Final Vol.	Volume (Vw)	Temp inlet	Temp outlet	Temp (tw)	Calibration Factors		Tolerance
(in. H_2O)	(cm H_2O)	(ft³)	(ft³)	(m³)	(°F)	(°F)	(°C)	(min)	Pa	(cm H_2O)	(L)	(L)	(m³)	(°C)	(°C)	(°C)	Y	Δ $H_@$	Y (<±2%)
0.25	0.635	677.47	683.32	0.166	70	70	21.1	20	20	0.20	247.82	415.12	0.167	20	20	20	1.008	1.675	1.0%
0.25	0.635	683.32	689.24	0.168	70	70	21.1	20	20	0.20	415.12	584.60	0.169	20	20	20	1.009	1.633	1.1%
0.25	0.635	689.24	695.12	0.167	70	70	21.1	20	20	0.20	584.60	752.55	0.168	20	20	20	1.007	1.662	0.9%
0.5	1.270	695.12	703.00	0.223	70	70	21.1	20	20	0.20	752.55	975.50	0.223	20	20	20	0.997	1.889	-0.2%
0.5	1.270	703.00	711.32	0.236	71	71	21.7	20	20	0.20	975.50	1211.01	0.236	20	20	20	0.999	1.690	0.1%
0.5	1.270	711.32	719.76	0.239	71	71	21.7	20	20	0.20	1211.01	1449.60	0.239	20	20	20	0.998	1.647	-0.1%
1	2.540	719.76	728.58	0.250	71	71	21.7	15	40	0.41	1449.60	1699.01	0.249	20	20	20	0.997	1.699	-0.1%
1	2.540	728.58	737.18	0.244	71	71	21.7	15	40	0.41	1699.01	1942.16	0.243	20	20	20	0.997	1.787	-0.1%
1	2.540	737.18	745.84	0.245	72	72	22.2	15	40	0.41	1942.16	2187.05	0.245	20	20	20	0.999	1.759	0.1%
2	5.080	745.84	755.68	0.279	72	72	22.2	12	60	0.61	2187.05	2465.36	0.278	20	20	20	0.997	1.751	-0.2%
2	5.080	755.68	765.25	0.271	72	72	22.2	12	60	0.61	2465.36	2735.94	0.271	20	20	20	0.996	1.852	-0.2%
2	5.080	765.25	774.95	0.275	73	73	22.8	12	60	0.61	2735.94	3009.29	0.273	20	20	20	0.995	1.812	-0.3%
4	10.160	774.95	785.98	0.312	73	73	22.8	10	80	0.82	3009.29	3320.08	0.311	20	20	20	0.990	1.965	-0.8%
4	10.160	785.98	797.02	0.313	73	73	22.8	10	80	0.82	3320.08	3632.08	0.312	20	20	20	0.993	1.950	-0.5%
4	10.160	797.02	808.02	0.311	73	73	22.8	10	80	0.82	3632.08	3942.94	0.311	20	20	20	0.993	1.965	-0.5%
																AVERAGE =	0.9983	1.7824	

Psychrometric Calculator
http://www.sugartech.co.za/psychro/index.php

How to use Pschrometic Calcutor
1) Dry Buld Temp = Ambient Temp of room
2) Select Relat. Humidity
3) Enter Relat. Humidity value
4) Calculate
5) Select IP Unit
6) W= Humidity Ratio

METHOD 5 DRY GAS METER CALIBRATION USING CRITICAL ORIFICES

ENVIRONMENTAL SUPPLY COMPANY

Quality - Service - Reliability

1) Select three critical orifices to calibrate the dry gas meter which bracket the expected operating range.
2) Record barometric pressure before and after calibration procedure.
3) Run at tested vacuum (from Orifice Calibration Report), for a period of time necessary to achieve a minimum total volume of 5 cubic feet.
4) Record readings in outlined boxes below, other columns are automatically calculated.

DATE: July 17, 2018 — METER SERIAL #: 16025475

METER ASSET #: A0001 — CRITICAL ORIFICE SET SERIAL #: 1372S

BAROMETRIC PRESSURE (in Hg): INITIAL 29.89 — FINAL 29.89 — AVG (P_{bar}) 29.89

IF Y VARIATION EXCEEDS 2.00%, ORIFICE SHOULD BE RECALIBRATED

ORIFICE #	RUN #	K' FACTOR (AVG)	TESTED VACUUM (in Hg)	DGM READINGS (FT^3) INITIAL	FINAL	NET (V_m)	TEMPERATURES °F AMBIENT	DGM INLET INITIAL	DGM INLET FINAL	DGM OUTLET INITIAL	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME (MIN) θ	DGM ΔH (in H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y	Y VARIATION (%)	$\Delta H_@$
48	1	0.8139	15.5	56.500	61.567	5.067	70	70	70	70	70	70.0	5.00	3.2	5.0835	5.2851	1.040		1.6162
48	2	0.8139	15.5	61.567	66.635	5.068	71	70	71	70	71	70.5	5.00	3.2	5.0797	5.2802	1.039		1.6178
48	3	0.8139	15.5	66.635	71.737	5.102	71	71	72	71	71	71.3	5.00	3.2	5.1065	5.2802	1.034		1.6155
																AVG =	1.038	1.19	1.6165
52	1	0.6199	18.0	75.800	81.258	5.458	72	73	74	71	72	72.5	7.00	2.0	5.4340	5.6249	1.035		1.7346
52	2	0.6199	18.0	81.258	86.725	5.467	72	74	75	72	72	73.3	7.00	2.0	5.4353	5.6249	1.035		1.7322
52	3	0.6199	18.0	86.725	92.192	5.467	72	75	76	72	73	74.0	7.00	2.0	5.4277	5.6249	1.036		1.7297
																AVG =	1.035	0.97	1.7322
54	1	0.4227	20.0	11.200	16.688	5.488	77	79	80	78	79	79.0	10.00	0.85	5.3828	5.4538	1.013		1.5767
54	2	0.4227	20.0	16.688	22.202	5.514	76	80	80	79	79	79.5	10.00	0.85	5.4033	5.4589	1.010		1.5723
54	3	0.4227	20.0	22.202	27.718	5.516	76	80	80	79	79	79.5	10.00	0.85	5.4052	5.4589	1.010		1.5723
																AVG =	1.011	-1.40	1.5737
56	1	0.3086	22.0	28.500	33.720	5.220	75	81	81	80	81	80.8	13.00	0.45	5.0983	5.1858	1.017		1.5536
56	2	0.3086	22.0	33.720	38.915	5.195	77	81	81	81	80	80.8	13.00	0.45	5.0739	5.1761	1.020		1.5595
56	3	0.3086	22.0	38.915	44.135	5.220	76	81	81	80	81	80.8	13.00	0.45	5.0983	5.1809	1.016		1.5565
																AVG =	1.018	-0.75	1.5565

USING THE CRITICAL ORIFICES AS CALIBRATION STANDARDS:
The following equations are used to calculate the standard volumes of air passed through the DGM, V_m (std), and the critical orifice, V_{cr} (std), and the DGM calibration factor, Y. These equations are automatically calculated in the spreadsheet above.

AVERAGE DRY GAS METER CALIBRATION FACTOR, Y = 1.026

AVERAGE $\Delta H_@$ = 1.6197

(1) $$V_m\,(std) = K_1\, V_m \frac{P_{bar} + (\Delta H/13.6)}{T_m}$$
= Net volume of gas sample passed through DGM, corrected to standard conditions
K_1 = 17.64 °R/in. Hg (English), 0.3858 °K/mm Hg (Metric)
T_m = Absolute DGM avg. temperature (°R - English, °K - Metric)

$$\Delta H_@ = \left(\frac{0.75\,\theta}{V_{cr}(std)}\right)^2 \Delta H \left(\frac{V_m(std)}{V_m}\right)$$

(2) $$V_{cr}\,(std) = K' \frac{P_{bar}\,\theta}{\sqrt{T_{amb}}}$$
= Volume of gas sample passed through the critical orifice, corrected to standard conditions
T_{amb} = Absolute ambient temperature (°R - English, °K - Metric)
K' = Average K' factor from Critical Orifice Calibration

(3) $$Y = \frac{V_{cr}\,(std)}{V_m\,(std)}$$
= DGM calibration factor

Quality - Service - Reliability

ENVIRONMENTAL SUPPLY COMPANY

METHOD 5 DRY GAS METER CALIBRATION USING CRITICAL ORIFICES

1) Select three critical orifices to calibrate the dry gas meter which bracket the expected operating range.
2) Record barometric pressure before and after calibration procedure.
3) Run at tested vacuum (from Orifice Calibration Report), for a period of time necessary to achieve a minimum total volume of 5 cubic feet.
4) Record readings in outlined boxes below, other columns are automatically calculated.

DATE: July 17, 2018 METER SERIAL #: 16025487

METER ASSET #: A06010 CRITICAL ORIFICE SET SERIAL #: 1372S

BAROMETRIC PRESSURE (in Hg): INITIAL 29.89 # FINAL 29.91 AVG (P_{bar}) 29.90

IF Y VARIATION EXCEEDS 2.00%, ORIFICE SHOULD BE RECALIBRATED

ORIFICE #	RUN #	K' FACTOR (AVG)	TESTED VACUUM (in Hg)	DGM READINGS (FT^3) INITIAL	FINAL	NET (V_m)	TEMPERATURES °F AMBIENT	DGM INLET INITIAL	DGM INLET FINAL	DGM OUTLET INITIAL	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME (MIN) θ	DGM ΔH (in H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y	Y VARIATION (%)	$\Delta H_@$
48	1	0.8139	17.5	2.084	7.411	5.327	75	81	81	80	81	80.8	5.00	4.1	5.2512	5.2621	1.002		2.0526
48	2	0.8139	17.5	7.411	12.719	5.308	77	81	81	81	81	81.0	5.00	4.1	5.2301	5.2523	1.004		2.0593
48	3	0.8139	17.5	12.719	18.085	5.366	76	81	81	81	81	81.0	5.00	4.1	5.2872	5.2572	0.994		2.0555
																AVG =	1.000	0.22	2.0558
52	1	0.6199	19.0	25.002	30.705	5.703	76	81	81	80	80	80.5	7.00	2.5	5.6026	5.6058	1.001		2.1541
52	2	0.6199	19.0	30.705	36.395	5.690	76	81	82	81	80	81.0	7.00	2.5	5.5846	5.6058	1.004		2.1522
52	3	0.6199	19.0	36.395	42.091	5.696	77	82	84	79	81	81.5	7.00	2.5	5.5854	5.6005	1.003		2.1542
																AVG =	1.002	0.44	2.1535
54	1	0.4227	21.0	45.768	51.384	5.616	76	84	84	82	82	83.0	10.00	1.1	5.4729	5.4607	0.998		2.0221
54	2	0.4227	21.0	51.384	56.997	5.613	75	84	84	82	82	83.0	10.00	1.1	5.470	5.4658	0.999		2.0184
54	3	0.4227	21.0	56.997	62.624	5.627	75	84	85	82	83	83.5	10.00	1.1	5.4786	5.4658	0.998		2.0165
																AVG =	0.998	0.02	2.0190
56	1	0.3086	22.0	64.909	70.281	5.372	76	85	86	83	83	84.3	13.00	0.53	5.2158	5.1827	0.994		1.8212
56	2	0.3086	22.0	70.281	75.640	5.359	76	86	86	83	82	84.3	13.00	0.53	5.2032	5.1827	0.996		1.8212
56	3	0.3086	22.0	75.640	81.060	5.420	77	86	86	82	83	84.3	13.00	0.53	5.2624	5.1778	0.984		1.8246
																AVG =	0.991	-0.68	1.8224

USING THE CRITICAL ORIFICES AS CALIBRATION STANDARDS:
The following equations are used to calculate the standard volumes of air passed through the DGM, V_m (std), and the critical orifice, V_{cr} (std), and the DGM calibration factor, Y. These equations are automatically calculated in the spreadsheet above.

AVERAGE DRY GAS METER CALIBRATION FACTOR, Y = 0.998

AVERAGE $\Delta H_@$ = 2.013

(1) $$V_m\text{(std)} = K_1 V_m \frac{P_{bar} + (\Delta H/13.6)}{T_m}$$ = Net volume of gas sample passed through DGM, corrected to standard conditions

K_1 = 17.64 °R/in. Hg (English), 0.3858 °K/mm Hg (Metric)

T_m = Absolute DGM avg. temperature (°R - English, °K - Metric)

$$\Delta H_@ = \left(\frac{0.75\,\theta}{V_{cr}\text{(std)}}\right)^2 \Delta H \left(\frac{V_m\text{(std)}}{V_m}\right)$$

(2) $$V_{cr}\text{(std)} = K' \sqrt{\frac{P_{bar}\,\theta}{T_{amb}}}$$ = Volume of gas sample passed through the critical orifice, corrected to standard conditions

T_{amb} = Absolute ambient temperature (°R - English, °K - Metric)

K' = Average K' factor from Critical Orifice Calibration

(3) $$Y = \frac{V_{cr}\text{(std)}}{V_m\text{(std)}}$$ = DGM calibration factor

VOST Calibration Certificate

Calibration Date: 21-Feb-18
DGM Console ID: RWDI - VOST - Clean Air
DGM Serial #: RWDI No. 1107
Barometric Pressure: 101.32 kPa 1013.2 mbar
W (lb/lb) 0.007624056
%r.H 44.00% **B_{wo} (ft^3/ft^3)** 0.0121 Ambient T 21 C
Calibration Done By: TD

leak check	VOST	WGM
intial value	0	33.78
final value	2.4	34.05
time (1 min)	1 min	1 min
Pass/Fail	PASS	PASS

Dry Gas Meter Values										ΔM	Wet Gas Meter Values						Calibration	
ΔH	Rotameter	Volume (Vd)			Temperature				Time	ΔM	Volume (Vw)			Temp (t_w)			Factor	Tolerance
	(Middle of Ball)	Initial	Final	Total	inlet	outlet	Avg (t_d)				Initial	Final	Total	inlet	outlet	Avg (t_w)		
(" H_2O)	(L/min)	(L)	(L)	(L)	(°F)	(°F)	(°F)	(°C)	(min)	(hPa H_2O)	(L)	(L)	(L)	(°C)	(°C)	(°C)	Y	± 2%
0.7	0.5	0.00	7.01	7.01	68	70	69.0	20.6	10	5	34.05	41.17	7.12	22	22	22	1.002	-1.1%
0.7	0.5	7.01	13.75	6.75	71	72	71.5	21.9	10	5	41.17	48.08	6.91	23	23	23	1.012	-0.2%
0.7	0.5	13.75	22.04	8.29	72	73	72.5	22.5	12	5	48.08	56.54	8.46	23	23	23	1.009	-0.4%
Average				7.35			71.0						7.50			22.7	1.008	
1.2	1.0	22.04	36.09	14.05	73	73	73.0	22.8	10	10	56.54	70.81	14.27	23	23	23	1.009	-0.4%
1.2	1.0	36.09	50.14	14.04	74	76	75.0	23.9	10	10	70.81	85.01	14.20	23	23	23	1.009	-0.5%
1.2	1.0	50.14	64.20	14.06	76	78	77.0	25.0	10	10	85.01	99.15	14.14	23	23	23	1.007	-0.7%
Average				14.05			75.0						14.20			23.0	1.008	
2.2	1.5	64.20	81.45	17.25	78	79	78.5	25.8	11	20	99.15	116.48	17.33	23	23	23	1.016	0.3%
2.2	1.5	81.45	97.25	15.81	79	79	79.0	26.1	10	20	116.48	132.38	15.9	23	23	23	1.018	0.5%
2.2	1.5	97.25	113.02	15.76	79	79	79.0	26.1	10	20	132.38	148.17	15.79	23	23	23	1.014	0.0%
Average				16.27			78.8						16.34			23.0	1.016	
3	1.9	113.02	127.82	14.80	79	79	79.0	26.1	5	40	148.17	162.92	14.75	23	23	23	1.026	1.2%
3	1.9	127.82	140.24	12.42	79	79	79.0	26.1	6	40	162.92	175.25	12.33	23	23	23	1.022	0.8%
3	1.9	140.24	152.72	12.48	79	79	79.0	26.1	5	40	175.25	187.59	12.34	23	23	23	1.018	0.4%
Average				13.23			79.0						13.14			23.0	1.022	
																AVERAGE =	1.013	

For Calculating W(lb/lb)
http://www.sugartech.co.za/psychro/index.php

How to use Pschrometic Calcutor
1) Dry Buld Temp = Ambient Temp of room
2) Select Relat. Humidity
3) Enter Relat. Humidity value
4) Calculate
5) Select IP Unit
6) W= Humidity Ratio

PM_{10}-$PM_{2.5}$ Pitot tube calibration

Pitot ID	5ft #1 (PM10_2.50)	Date	7/10/2018
Calibrated By	TD	$C_{p\ (std)}$	0.998
Temperature F°	78	Static	0.25
Barometric $_{inHG}$	29.92	Page #	1 of 2

Cyclone ID: Apex

Nozzle ID	Fan Speed (Htz)	FPM	Nozzle Size	$\Delta P_{(STD)}$	$\Delta P_{(S\text{-}Type)}$	$C_{p\ (S\text{-}TYPE)}$	Pitot Factor C_P
0	35	2625.861	.125"	0.43	0.64	0.8173	0.838
	42	3253.19		0.66	0.93	0.839305	
	49	3819.954		0.91	1.26	0.847589	
	55	4386.6		1.2	1.70	0.838981	
	60	4565.718		1.3	1.80	0.848821	
1	35	2831.538	.128"	0.5	0.70	0.846493	0.836
	42	3490.955		0.76	1.07	0.84193	
	49	3964.154		0.98	1.45	0.820464	
	55	4477.055		1.25	1.85	0.820351	
	60	4821.936		1.45	2.00	0.849766	
2	35	2803	.133"	0.49	0.68	0.844141	0.835
	42	3398		0.72	0.99	0.852131	
	49	3964		0.98	1.34	0.854561	
	55	4387		1.2	1.87	0.799467	
	60	4904		1.5	2.20	0.824071	
3	35	2831.538	.160"	0.5	0.71	0.837503	0.837
	42	3397.846		0.72	1.00	0.846831	
	49	3964.154		0.98	1.41	0.83202	
	55	4386.6		1.2	1.74	0.828794	
	60	4738.07		1.4	1.98	0.839193	
4	35	2715.916	.178"	0.46	0.65	0.840481	0.841
	42	3397.846		0.72	1.00	0.845075	
	49	3943.877		0.97	1.36	0.843219	
	55	4386.6		1.2	1.70	0.838093	
	60	4738.07		1.4	1.98	0.83966	
5	35	2774.33	0.196"	0.48	0.72	0.814864	0.833
	42	3350.321		0.7	1.00	0.834987	
	49	3903.006		0.95	1.41	0.819187	
	55	4199.85		1.1	1.61	0.824924	
	60	4738.07		1.4	1.84	0.870534	

PM_{10}-$PM_{2.5}$ Pitot tube calibration

Pitot ID	5ft #1 (PM10_2.50)	Date	7/10/2018
Calibrated By	TD	$C_{p\ (std)}$	0.998
Temperature F^{o}	78	Static	0.25
Barometric $_{inHG}$	29.92	Page #	2 of 2

Cyclone ID: Apex

Nozzle ID	Fan Speed (Htz)	FPM	Nozzle Size	$\Delta P_{(STD)}$	$\Delta P_{(S\text{-}Type)}$	$C_{p\ (S\text{-}TYPE)}$	Pitot Factor C_P
6	35	2942.621	.215"	0.54	0.79	0.8251	0.836
	42	3350.321		0.7	1.00	0.8350	
	49	3819.954		0.91	1.24	0.8549	
	55	4294.241		1.15	1.65	0.8332	
	60	4652.692		1.35	1.94	0.8325	
7	35	2803.08	.235"	0.49	0.71	0.8285	0.830
	42	3374.167		0.71	1.05	0.8207	
	49	3943.877		0.97	1.36	0.8428	
	55	4386.6		1.2	1.77	0.8226	
	60	4738.07		1.4	2.01	0.8333	
8	35	2860	.264"	0.51	0.70	0.8513	0.836
	42	3468		0.75	1.00	0.8627	
	49	3903		0.95	1.35	0.8364	
	55	4387		1.2	1.70	0.8374	
	60	4653		1.35	2.14	0.7918	
9	35	2715.916	.299"	0.46	0.70	0.8070	0.844
	42	3374.167		0.71	1.01	0.8379	
	49	3964.154		0.98	1.39	0.8368	
	55	4477.055		1.25	1.70	0.8546	
	60	4985.438		1.55	1.97	0.8859	
10	35	2656.218	.341"	0.44	0.66	0.8121	0.838
	42	3302.113		0.68	1.02	0.8148	
	49	3903.006		0.95	1.37	0.8296	
	55	4565.718		1.3	1.72	0.8682	
	60	4904.368		1.5	1.99	0.8656	
11	35	2595.148	0.319"	0.42	0.68	0.7860	0.846
	42	3228.45		0.65	0.98	0.8144	
	49	3943.877		0.97	1.36	0.8423	
	55	4477.055		1.25	1.56	0.8931	
	60	4821.936		1.45	1.81	0.8932	

S-Type Pitot tube calibration

Pitot ID	7' #1	Date	Sept. 11, 2018
Calibrated By	Derek Ottens	$C_{p\ (std)}$	0.998
Temperature F°	71.4	Static	0.3
Barometric $_{inHG}$	30.2		

Fan Speed (Htz)	FPM	Nozzle Size	$\Delta P_{(STD)}$	$\Delta P_{(S\text{-}Type)}$	$C_{p\ (S\text{-}TYPE)}$	Pitot Factor C_P
35	2803.08	.125"	0.49	0.72	0.823308	0.827
42	3302.113		0.68	0.99	0.827118	
49	3648.182		0.83	1.2	0.830002	
55	4142.184		1.07	1.55	0.829195	
60	4386.6		1.2	1.75	0.826423	
35	2745.278	.187"	0.47	0.68	0.829707	0.824
42	3374.167		0.71	1.05	0.820663	
49	3840.886		0.92	1.35	0.823868	
55	4199.85		1.1	1.6	0.827498	
60	4477.055		1.25	1.85	0.820351	
35	2774	.250"	0.48	0.71	0.820582	0.823
42	3278		0.67	0.99	0.821014	
49	3820		0.91	1.35	0.819378	
55	4142		1.07	1.55	0.829195	
60	4477		1.25	1.82	0.827084	
35	2803.08	.325"	0.49	0.72	0.823308	0.821
42	3350.321		0.7	1.05	0.814864	
49	3648.182		0.83	1.22	0.82317	
55	4142.184		1.07	1.57	0.823896	
60	4477.055		1.25	1.85	0.820351	
35	2715.916	.375"	0.46	0.66	0.833177	0.830
42	3127.536		0.61	0.89	0.826229	
49	3648.182		0.83	1.2	0.830002	
55	4142.184		1.07	1.55	0.829195	
60	4477.055		1.25	1.8	0.831667	
35	2803.08	0.435"	0.49	0.774	0.794069	0.802
42	3350.321		0.7	1.1	0.796129	
49	3735.056		0.87	1.4	0.786731	
55	4142.184		1.07	1.6	0.816136	
60	4565.718		1.3	1.95	0.814864	
35	2774.33	.500"	0.48	0.76	0.79313	0.801
42	3302.113		0.68	1.07	0.795597	
49	3861.704		0.93	1.45	0.79926	
55	4142.184		1.07	1.65	0.803675	
60	4386.6		1.2	1.8	0.814864	

S-Type Pitot tube calibration

Pitot ID	7ft #3	Date	September 11, 2018
Calibrated By	Derek Ottens	$C_{p\ (std)}$	0.998
Temperature F°	72	Static	0.25
Barometric $_{inHG}$	29.92		

Fan Speed (Htz)	FPM	Nozzle Size	$\Delta P_{(STD)}$	$\Delta P_{(S\text{-}Type)}$	$C_{p\ (S\text{-}TYPE)}$	Pitot Factor C_P
35	2656.218	.125"	0.44	0.59	0.861848	0.845
42	3228.45		0.65	0.88	0.857721	
49	3691.874		0.85	1.2	0.839942	
55	4103.289		1.05	1.5	0.834987	
60	4477.055		1.25	1.8	0.831667	
35	2625.861	.187"	0.43	0.61	0.837915	0.838
42	3228.45		0.65	0.92	0.838867	
49	3713.528		0.86	1.25	0.827799	
55	4103.289		1.05	1.5	0.834987	
60	4565.718		1.3	1.8	0.848137	
35	2626	.250"	0.43	0.59	0.851998	0.840
42	3204		0.64	0.91	0.836951	
49	3756		0.88	1.25	0.837369	
55	4200		1.1	1.6	0.827498	
60	4566		1.3	1.8	0.848137	
35	2625.861	.325"	0.43	0.64	0.81804	0.834
42	3203.52		0.64	0.89	0.846302	
49	3713.528		0.86	1.3	0.811723	
55	4199.85		1.1	1.5	0.854636	
60	4386.6		1.2	1.7	0.838488	
35	2564.067	.375"	0.41	0.54	0.869612	0.848
42	3153.068		0.62	0.85	0.852348	
49	3691.874		0.85	1.15	0.858007	
55	4199.85		1.1	1.6	0.827498	
60	4477.055		1.25	1.8	0.831667	
35	2625.861	0.435"	0.43	0.59	0.851998	0.839
42	3228.45		0.65	0.9	0.848137	
49	3691.874		0.85	1.2	0.839942	
55	4103.289		1.05	1.5	0.834987	
60	4477.055		1.25	1.85	0.820351	
35	2656.218	.500"	0.44	0.65	0.821108	0.835
42	3153.068		0.62	0.89	0.832974	
49	3670.093		0.84	1.15	0.852945	
55	4199.85		1.1	1.55	0.840739	
60	4565.718		1.3	1.9	0.825516	

PRAXAIR

Praxair Canada Inc.
41 Consolidated Drive
Paris, Ontario
N3L 3G2
Tel.: (519) 442-6373
Fax: (519) 442-1540

Issue Date: October 21,2010

To: RWDI

Attn: ---

Praxair Order Number: 11685646
Customer Order Number: ---
Customer Reference Number: ---

Product Lot Number: Y787029402
Product Part Number: NI CD20CO10P-AS

CERTIFICATE OF ANALYSIS

(Primary Standard)

Cylinder Serial Number	*Components*	*Requested Concentration*	*Certified Concentration*	*Analytical Principle*/ Instrument*	*Analytical Uncertainty*
CC262955	Carbon Dioxide	20%	20.00%	L	+/- 0.02%
	Carbon Monoxide	0.05%	0.050%	L	+/- 0.02%
	Oxygen	21%	21.00%	L	+/- 0.02%
	Nitrogen	Balance	Balance		

Cylinder Style: AS
Cylinder Pressure @ 70°F(21°C): 2000

Valve Outlet Connection: CGA 590
Filling Method: Gravimetric
Date of Fill: Oct 21, 2010

Approved Signer: ______ (Lab Technician)

Counter Signer: ______ (Quality Assurance Reviewer)

This gas calibration cylinder standard prepared by Praxair Distribution is considered a certified standard. It is prepared by gravimetric, volumetric, or partial pressure techniques. The calibration standard provided is certified against Praxair Reference Materials which are either prepared by weights traceable to the National Institute of Standards and Technology (NIST), Measurement Canada or by using NIST Standard Reference Materials where available.

Note: All expressions for concentration (e.g., % or ppm) are for gas phase, by volume (e.g., ppmv) unless otherwise noted

*Key to Analytical Principle:

A. Flame Ionization with Methanizer
B. Gas Chromatography with Discharge Ionization Detector
C. Gas Chromatography with Electrolytic Conductivity Detector
D. Gas Chromatography with Flame Ionization Detector
E. Gas Chromatography with Flame Photometric Detector
F. Gas Chromatography with Helium Ionization Detector
G. Gas Chromatography with Methanizer Carbonizer
H. Oxygen Analyzer with Fuel Cell
I. Oxygen Analyzer with Electrolytic Cell
J. Gas Chromatography with Thermal Conductivity Detector
K. Chemiluminesence
L. Gravimetric Methods
M. Infrared – FTIR or NDIR
N. Electrochemical
O. Paramagnetic
P. Specific Moisture Analyzer
Q. Total Hydrocarbon Analyzer
R. Wet Chemical
S. Detector Tube
T. Odour

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Tel: (323) 585-2154 Fax:(714) 542-6689
PGVP ID: F22016

DocNumber: 000101297

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PRAXAIR PKG PARIS P/H 80271
41 CONSOLIDATED DR
PARIS ON N3L 3G

Praxair Order Number: 85634367
Customer P. O. Number: 27744997 KITCHE
Customer Reference Number:

Fill Date: 11/18/2016
Part Number: NI ME100E-AS
Lot Number: 109632307
Cylinder Style & Outlet: AS CGA 350
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date:	**11/30/2024**		NIST Traceable
Cylinder Number:	**ALM-000810**		Analytical Uncertainty:
100.3	**ppm**	**METHANE**	± 1 %
	Balance	**NITROGEN**	

Certifcation Information: *Certification Date:* 11/30/2016 *Term:* 96 Months *Expiration Date:* 11/30/2024

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Do Not Use this Standard if Pressure is less than 100 PSIG.

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1. **Component: METHANE**

Requested Concentration: 100 ppm

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC211670

PRAXAIR

Praxair Distribution, Inc,
6055 Brent Drive
Toledo, OH 43611
Tel: (419) 729-7732 Fax:(419) 729-2411
PGVP ID: F12015

DocNumber: 000010172

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PRAXAIR PKG PARIS P/H 80271
41 CONSOLIDATED DR
PARIS ON N3L 3G

Praxair Order Number: 31691213
Customer P. O. Number:
Customer Reference Number:

Fill Date: 6/24/2015
Part Number: NI CD10CO24E-AS
Lot Number: 0624UB15
Cylinder Style & Outlet: AS CGA 590
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date: 6/29/2023 — NIST Traceable
Cylinder Number: EB0024904 — Analytical Uncertainty:

152	ppm	CARBON MONOXIDE	± 0.4 %
10.3	%	CARBON DIOXIDE	± 0.8 %
10.0	%	OXYGEN	± 0.2 %
	Balance	NITROGEN	

Certifcation Information: *Certification Date:* 6/29/2015 *Term:* 96 Months *Expiration Date:* 6/29/2023

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1.
Do Not Use this Standard if Pressure is less than 100 PSIG.

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1. Component: CARBON MONOXIDE

Requested Concentration: 150 ppm
Certified Concentration: 152 ppm
Instrument Used: MKS 2031
Analytical Method: FOURIER-TRANSFORM INFRAR
Last Multipoint Calibration: 6/24/2015

Reference Standard Type: GMIS
Ref. Std. Cylinder # : DT0004193
Ref. Std. Conc: 250.5 PPM
Ref. Std. Traceable to SRM # : 2636A
SRM Sample # : 57-F-15
SRM Cylinder # : FF30792

First Analysis Data:						Date:	6/29/2015
Z:	0	R:	250.4	C:	152	Conc:	151.92
R:	250.5	Z:	0	C:	152	Conc:	151.92
Z:	0	C:	152	R:	251	Conc:	151.92
UOM:	PPM					Mean Test Assay:	151.92 PPM

Second Analysis Data:						Date:	
Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0
UOM:	PPM					Mean Test Assay:	0 PPM

2. Component: CARBON DIOXIDE

Requested Concentration: 10.0 %
Certified Concentration: 10.3 %
Instrument Used: MKS 2031
Analytical Method: FOURIER-TRANSFORM INFRAR
Last Multipoint Calibration: 6/25/2015

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC318717
Ref. Std. Conc: 20.1%
Ref. Std. Traceable to SRM # : 2745
SRM Sample # : 9-C-03
SRM Cylinder # : CAL016000

First Analysis Data:						Date:	6/29/2015
Z:	0	R:	20.2	C:	10.3	Conc:	10.266
R:	20.1	Z:	0	C:	10.3	Conc:	10.266
Z:	0	C:	10.3	R:	20.2	Conc:	10.266
UOM:	%					Mean Test Assay:	10.266 %

Second Analysis Data:						Date:	
Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0
UOM:	%					Mean Test Assay:	0 %

PRAXAIR

Praxair Distribution, Inc,
6055 Brent Drive
Toledo, OH 43611
Tel: (419) 729-7732 Fax:(419) 729-2411
PGVP ID: F12015

DocNumber: 000010172

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

3. Component: OXYGEN

Requested Concentration:	10.0 %
Certified Concentration:	10.0 %
Instrument Used:	Servomex 575
Analytical Method:	Paramagnetic
Last Multipoint Calibration:	6/23/2015

Reference Standard Type:	GMIS
Ref. Std. Cylinder # :	EB0054984
Ref. Std. Conc:	22.33
Ref. Std. Traceable to SRM # :	2659a
SRM Sample # :	71-D-04
SRM Cylinder # :	Cal05785

First Analysis Data: **Date:** 6/29/2015

Z:	0	R:	22.33	C:	9.97	Conc:	9.97
R:	22.33	Z:	0	C:	9.97	Conc:	9.97
Z:	0	C:	9.97	R:	22.33	Conc:	9.97

UOM: % **Mean Test Assay:** 9.97 %

Second Analysis Data: **Date:**

Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0

UOM: % **Mean Test Assay:** 0 %

Analyzed by: For
Mike Monnette

Certified by:
Rolonda Kaywood

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Tel: (323) 585-2154 Fax:(714) 542-6689
PGVP ID: F22016

DocNumber: 000101296

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PRAXAIR PKG PARIS P/H 80271
41 CONSOLIDATED DR
PARIS ON N3L 3G

Praxair Order Number: 85633662
Customer P. O. Number: 27744977 KITCHE
Customer Reference Number:

Fill Date: 11/18/2016
Part Number: NI ME500E-AS
Lot Number: 109632306
Cylinder Style & Outlet: AS CGA 350
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date: **11/30/2024**
Cylinder Number: **AAL9956**

NIST Traceable
Analytical Uncertainty:

501	**ppm**	**METHANE**	± 0.4 %
	Balance	**NITROGEN**	

Certifcation Information: *Certification Date:* 11/30/2016 *Term:* 96 Months *Expiration Date:* 11/30/2024

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Do Not Use this Standard if Pressure is less than 100 PSIG.

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1 . **Component:** **METHANE**
Requested Concentration: 500 ppm

Reference Standard Type: GMIS
Ref. Std. Cylinder # : DT0010335

APPENDIX J

APPENDIX K

Your Project #: 1804600
Site#: MEDIA PREP
Site Location: ST. MARY'S BOWMANVILLE

Attention: kirk easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/10/05
Report #: R5429871
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8O6229
Received: 2018/09/20, 13:14

Sample Matrix: Air Sampling Media
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
VOST EPA5041A, 8260C for 0030, 0031	1	N/A	2018/10/05	BRL SOP-00302	EPA5041A, 8260C

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam’s profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B8O6229
Report Date: 2018/10/05

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

VOLATILE ORGANICS BY GC/MS (AIR SAMPLING MEDIA)

Maxxam ID		HUN830			
Sampling Date		2018/09/20 13:43			
	UNITS	**VOST PROOF 1-9**	**RDL**	**MDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug	<0.020	0.020	0.020	5769575
Chloromethane	ug	<0.015	0.015	0.015	5769575
Vinyl Chloride	ug	<0.013	0.013	0.013	5769575
Bromomethane	ug	<0.015	0.015	0.015	5769575
Chloroethane	ug	<0.0090	0.0090	0.0090	5769575
Trichlorofluoromethane (FREON 11)	ug	<0.010	0.010	0.010	5769575
Acetone (2-Propanone)	ug	<0.045	0.045	0.025	5769575
1,1-Dichloroethylene	ug	<0.011	0.011	0.011	5769575
Iodomethane	ug	<0.015	0.015	0.015	5769575
Carbon Disulfide	ug	<0.026	0.026	0.026	5769575
Methylene Chloride(Dichloromethane)	ug	<0.019	0.019	0.020	5769575
1,1-Dichloroethane	ug	<0.012	0.012	0.012	5769575
trans-1,2-Dichloroethylene	ug	<0.010	0.010	0.010	5769575
cis-1,2-Dichloroethylene	ug	<0.010	0.010	0.010	5769575
Chloroform	ug	<0.011	0.011	0.011	5769575
1,2-Dichloroethane	ug	<0.0070	0.0070	0.0070	5769575
Methyl Ethyl Ketone (2-Butanone)	ug	<0.036	0.036	0.036	5769575
1,1,1-Trichloroethane	ug	<0.014	0.014	0.014	5769575
Carbon Tetrachloride	ug	<0.016	0.016	0.016	5769575
Benzene	ug	<0.0090	0.0090	0.0090	5769575
1,1,2-Trichloroethane	ug	<0.016	0.016	0.016	5769575
1,2-Dichloropropane	ug	<0.011	0.011	0.011	5769575
Trichloroethylene	ug	<0.011	0.011	0.011	5769575
Dibromomethane	ug	<0.010	0.010	0.010	5769575
Bromodichloromethane	ug	<0.011	0.011	0.011	5769575
cis-1,3-Dichloropropene	ug	<0.010	0.010	0.010	5769575
trans-1,3-Dichloropropene	ug	<0.0070	0.0070	0.0070	5769575
Dibromochloromethane	ug	<0.0090	0.0090	0.0090	5769575
Methyl Isobutyl Ketone	ug	<0.019	0.019	0.019	5769575
Methyl Butyl Ketone (2-Hexanone)	ug	<0.031	0.031	0.031	5769575
Toluene	ug	<0.014	0.014	0.014	5769575
Ethylene Dibromide	ug	<0.010	0.010	0.010	5769575
Tetrachloroethylene	ug	<0.018	0.018	0.018	5769575
Chlorobenzene	ug	<0.011	0.011	0.011	5769575
1,1,1,2-Tetrachloroethane	ug	<0.010	0.010	0.010	5769575

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam
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Maxxam Job #: B8O6229
Report Date: 2018/10/05

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

VOLATILE ORGANICS BY GC/MS (AIR SAMPLING MEDIA)

Maxxam ID		HUN830			
Sampling Date		2018/09/20 13:43			
	UNITS	**VOST PROOF 1-9**	**RDL**	**MDL**	**QC Batch**
Ethylbenzene	ug	<0.014	0.014	0.014	5769575
m / p-Xylene	ug	<0.015	0.015	0.015	5769575
Styrene	ug	<0.012	0.012	0.012	5769575
o-Xylene	ug	<0.015	0.015	0.015	5769575
Bromoform	ug	<0.014	0.014	0.014	5769575
1,1,2,2-Tetrachloroethane	ug	<0.014	0.014	0.014	5769575
1,2,3-Trichloropropane	ug	<0.015	0.015	0.015	5769575
1,3-Dichlorobenzene	ug	<0.020	0.020	0.020	5769575
1,4-Dichlorobenzene	ug	<0.020	0.020	0.020	5769575
1,2-Dichlorobenzene	ug	<0.020	0.020	0.020	5769575
Surrogate Recovery (%)					
Bromofluorobenzene	%	103			5769575
D10-Ethylbenzene (FS)	%	101			5769575
D4-1,2-Dichloroethane	%	108			5769575
D8-Toluene	%	101			5769575
RDL = Reportable Detection Limit QC Batch = Quality Control Batch					

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B8O6229
Report Date: 2018/10/05

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

TEST SUMMARY

Maxxam ID: HUN830
Sample ID: VOST PROOF 1-9
Matrix: Air Sampling Media

Collected: 2018/09/20
Shipped:
Received: 2018/09/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	5769575	N/A	2018/10/05	Yujie Yan

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

GENERAL COMMENTS

Results relate only to the items tested.

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Maureen Smith

Maureen Smith, Supervisor, Volatiles

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

SAMPLE#: Method Blank

Field ID#: Method Blank

Number of TICs found:_____0_____

Concentration Units
ug

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		Cumene < 0.025ug			

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

SAMPLE#: INA543

Field ID#: M0030-BLANK-#2A/B

Number of TICs found:_____1_____

Concentration Units
ug

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.	98-82-8	Cumene < 0.025ug	11.99	0.19	

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

SAMPLE#: INA544

Field ID#: M0030-ALTFUEL-T1-#1A/B

Number of TICs found:_____0_____

Concentration Units
ug

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.	98-82-8	Cumene	11.99	0.30	

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

SAMPLE#: INA545

Field ID#: M0030-ALTFUEL-T2-#8A/B

Number of TICs found:_____0_____

Concentration Units
ug

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		Cumene < 1 ug			

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

SAMPLE#: INA546

Field ID#: M0030-ALTFUEL-T3-#10A/B

Number of TICs found:_____0_____

Concentration Units
ug

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		Cumene < 1 ug			

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

SAMPLE#: INA546

Field ID#: M0030-BASELINE-T1-#5A/B

Concentration Units
ug

Number of TICs found:_____0_____

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		Cumene < 1 ug			

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

SAMPLE#:	INE337
Field ID#:	M0030-BASELINE-T2-#3A/B

Number of TICs found:_____0_____

Concentration Units
ug

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		Cumene < 1 ug			

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

SAMPLE#: INE338

Field ID#: M0030-BASELINE-T3-#6A/B

Number of TICs found:_____0_____

Concentration Units
ug

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		Cumene < 1 ug			

Maxxam
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Site Location: ST. MARYS
Your C.O.C. #: 30742

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/12/20
Report #: R5534742
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8X0018
Received: 2018/12/10, 10:21

Sample Matrix: Stack Sampling Train
Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
VOST EPA5041A, 8260C for 0030, 0031	7	N/A	2018/12/12	BRL SOP-00302	EPA5041A, 8260C

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769
==
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Maxxam Job #: B8X0018
Report Date: 2018/12/20

RWDI Air Inc
Site Location: ST. MARYS

VOLATILE ORGANICS BY GC/MS (STACK SAMPLING TRAIN)

Maxxam ID		INA543	INA544			
Sampling Date			2018/12/04			
COC Number		30742	30742			
	UNITS	**M0030- BLANK-#2A/B**	**M0030- ALTFUEL-T1-#1A/B**	**RDL**	**MDL**	**QC Batch**
Chloromethane	ug	ND	3.58	0.015	0.015	5884842
Vinyl Chloride	ug	ND	0.128	0.013	0.013	5884842
Bromomethane	ug	ND	0.332	0.015	0.015	5884842
Chloroethane	ug	ND	0.898	0.0090	0.0090	5884842
Acetone (2-Propanone)	ug	ND	10.7	0.045	0.025	5884842
1,1-Dichloroethylene	ug	ND	ND	0.011	0.011	5884842
Methylene Chloride(Dichloromethane)	ug	ND	ND	0.019	0.020	5884842
1,1-Dichloroethane	ug	ND	ND	0.012	0.012	5884842
trans-1,2-Dichloroethylene	ug	ND	ND	0.010	0.010	5884842
cis-1,2-Dichloroethylene	ug	ND	ND	0.010	0.010	5884842
Chloroform	ug	ND	ND	0.011	0.011	5884842
1,2-Dichloroethane	ug	ND	ND	0.0070	0.0070	5884842
Methyl Ethyl Ketone (2-Butanone)	ug	ND	ND	0.036	0.036	5884842
1,1,1-Trichloroethane	ug	ND	ND	0.014	0.014	5884842
Carbon Tetrachloride	ug	ND	ND	0.016	0.016	5884842
Benzene	ug	ND	7.76	0.0090	0.0090	5884842
1,1,2-Trichloroethane	ug	ND	ND	0.016	0.016	5884842
1,2-Dichloropropane	ug	ND	ND	0.011	0.011	5884842
Trichloroethylene	ug	ND	ND	0.011	0.011	5884842
Bromodichloromethane	ug	ND	ND	0.011	0.011	5884842
Dibromochloromethane	ug	ND	ND	0.0090	0.0090	5884842
Toluene	ug	ND	3.53	0.014	0.014	5884842
Ethylene Dibromide	ug	ND	ND	0.010	0.010	5884842
Tetrachloroethylene	ug	ND	ND	0.018	0.018	5884842
Chlorobenzene	ug	ND	0.721	0.011	0.011	5884842
1,1,1,2-Tetrachloroethane	ug	ND	ND	0.010	0.010	5884842
Ethylbenzene	ug	ND	1.96	0.014	0.014	5884842
m / p-Xylene	ug	ND	6.34	0.015	0.015	5884842
Styrene	ug	ND	1.62	0.012	0.012	5884842
o-Xylene	ug	ND	2.57	0.015	0.015	5884842
Bromoform	ug	ND	ND	0.014	0.014	5884842
1,1,2,2-Tetrachloroethane	ug	ND	ND	0.014	0.014	5884842
Surrogate Recovery (%)						
Bromofluorobenzene	%	104	89			5884842
D10-Ethylbenzene (FS)	%	125	122			5884842

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B8X0018
Report Date: 2018/12/20

RWDI Air Inc
Site Location: ST. MARYS

VOLATILE ORGANICS BY GC/MS (STACK SAMPLING TRAIN)

Maxxam ID		INA543	INA544			
Sampling Date			2018/12/04			
COC Number		30742	30742			
	UNITS	**M0030- BLANK-#2A/B**	**M0030- ALTFUEL-T1-#1A/B**	**RDL**	**MDL**	**QC Batch**
D4-1,2-Dichloroethane	%	107	331 (1)			5884842
D8-Toluene	%	98	131 (1)			5884842

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B8X0018
Report Date: 2018/12/20

RWDI Air Inc
Site Location: ST. MARYS

VOLATILE ORGANICS BY GC/MS (STACK SAMPLING TRAIN)

Maxxam ID		INA545	INA546	INE336			
Sampling Date		2018/12/04	2018/12/04	2018/12/04			
COC Number		30742	30742	30742			
	UNITS	**M0030- ALTFUEL-T2-#8A/B**	**M0030- ALTFUEL-T3-#10A/B**	**M0030- BASELINE-T1-#5A/B**	**RDL**	**MDL**	**QC Batch**
Chloromethane	ug	7.79	7.68	8.00	0.60	0.60	5884842
Vinyl Chloride	ug	ND	ND	ND	0.52	0.52	5884842
Bromomethane	ug	1.13	0.86	0.76	0.60	0.60	5884842
Chloroethane	ug	0.44	0.56	0.71	0.36	0.36	5884842
Acetone (2-Propanone)	ug	7.1	8.3	5.6	1.8	1.0	5884842
1,1-Dichloroethylene	ug	ND	ND	ND	0.44	0.44	5884842
Methylene Chloride(Dichloromethane)	ug	ND	ND	ND	0.76	0.80	5884842
1,1-Dichloroethane	ug	ND	ND	ND	0.48	0.48	5884842
trans-1,2-Dichloroethylene	ug	ND	ND	ND	0.40	0.40	5884842
cis-1,2-Dichloroethylene	ug	ND	ND	ND	0.40	0.40	5884842
Chloroform	ug	ND	ND	ND	0.44	0.44	5884842
1,2-Dichloroethane	ug	ND	ND	ND	0.28	0.28	5884842
Methyl Ethyl Ketone (2-Butanone)	ug	ND	ND	ND	1.4	1.4	5884842
1,1,1-Trichloroethane	ug	ND	ND	ND	0.56	0.56	5884842
Carbon Tetrachloride	ug	ND	ND	ND	0.64	0.64	5884842
Benzene	ug	19.7	24.1	21.7	0.36	0.36	5884842
1,1,2-Trichloroethane	ug	ND	ND	ND	0.64	0.64	5884842
1,2-Dichloropropane	ug	ND	ND	ND	0.44	0.44	5884842
Trichloroethylene	ug	ND	ND	ND	0.44	0.44	5884842
Bromodichloromethane	ug	ND	ND	ND	0.44	0.44	5884842
Dibromochloromethane	ug	ND	ND	ND	0.36	0.36	5884842
Toluene	ug	13.1	16.8	16.3	0.56	0.56	5884842
Ethylene Dibromide	ug	ND	ND	ND	0.40	0.40	5884842
Tetrachloroethylene	ug	ND	ND	ND	0.72	0.72	5884842
Chlorobenzene	ug	0.46	0.57	0.53	0.44	0.44	5884842
1,1,1,2-Tetrachloroethane	ug	ND	ND	ND	0.40	0.40	5884842
Ethylbenzene	ug	2.59	3.28	3.11	0.56	0.56	5884842
m / p-Xylene	ug	11.7	14.6	14.6	0.60	0.60	5884842
Styrene	ug	1.93	2.60	2.88	0.48	0.48	5884842
o-Xylene	ug	4.45	5.64	5.61	0.60	0.60	5884842
Bromoform	ug	ND	ND	ND	0.56	0.56	5884842
1,1,2,2-Tetrachloroethane	ug	ND	ND	ND	0.56	0.56	5884842
Surrogate Recovery (%)							
Bromofluorobenzene	%	71	87	81			5884842
D4-1,2-Dichloroethane	%	88	104	98			5884842

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Maxxam Job #: B8X0018
Report Date: 2018/12/20

RWDI Air Inc
Site Location: ST. MARYS

VOLATILE ORGANICS BY GC/MS (STACK SAMPLING TRAIN)

Maxxam ID		INA545	INA546	INE336			
Sampling Date		2018/12/04	2018/12/04	2018/12/04			
COC Number		30742	30742	30742			
	UNITS	**M0030- ALTFUEL-T2-#8A/B**	**M0030- ALTFUEL-T3-#10A/B**	**M0030- BASELINE-T1-#5A/B**	**RDL**	**MDL**	**QC Batch**
D8-Toluene	%	76	91	84			5884842

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8X0018
Report Date: 2018/12/20

RWDI Air Inc
Site Location: ST. MARYS

VOLATILE ORGANICS BY GC/MS (STACK SAMPLING TRAIN)

Maxxam ID		INE337	INE338			
Sampling Date		2018/12/04	2018/12/04			
COC Number		30742	30742			
	UNITS	**M0030- BASELINE-T2-#3A/B**	**M0030- BASELINE-T3-#6A/B**	**RDL**	**MDL**	**QC Batch**
Chloromethane	ug	6.96	6.42	0.60	0.60	5884842
Vinyl Chloride	ug	ND	ND	0.52	0.52	5884842
Bromomethane	ug	0.62	ND	0.60	0.60	5884842
Chloroethane	ug	0.54	0.60	0.36	0.36	5884842
Acetone (2-Propanone)	ug	5.2	6.1	1.8	1.0	5884842
1,1-Dichloroethylene	ug	ND	ND	0.44	0.44	5884842
Methylene Chloride(Dichloromethane)	ug	ND	ND	0.76	0.80	5884842
1,1-Dichloroethane	ug	ND	ND	0.48	0.48	5884842
trans-1,2-Dichloroethylene	ug	ND	ND	0.40	0.40	5884842
cis-1,2-Dichloroethylene	ug	ND	ND	0.40	0.40	5884842
Chloroform	ug	ND	ND	0.44	0.44	5884842
1,2-Dichloroethane	ug	ND	ND	0.28	0.28	5884842
Methyl Ethyl Ketone (2-Butanone)	ug	ND	ND	1.4	1.4	5884842
1,1,1-Trichloroethane	ug	ND	ND	0.56	0.56	5884842
Carbon Tetrachloride	ug	ND	ND	0.64	0.64	5884842
Benzene	ug	16.8	19.2	0.36	0.36	5884842
1,1,2-Trichloroethane	ug	ND	ND	0.64	0.64	5884842
1,2-Dichloropropane	ug	ND	ND	0.44	0.44	5884842
Trichloroethylene	ug	ND	ND	0.44	0.44	5884842
Bromodichloromethane	ug	ND	ND	0.44	0.44	5884842
Dibromochloromethane	ug	ND	ND	0.36	0.36	5884842
Toluene	ug	12.4	14.5	0.56	0.56	5884842
Ethylene Dibromide	ug	ND	ND	0.40	0.40	5884842
Tetrachloroethylene	ug	ND	ND	0.72	0.72	5884842
Chlorobenzene	ug	ND	0.49	0.44	0.44	5884842
1,1,1,2-Tetrachloroethane	ug	ND	ND	0.40	0.40	5884842
Ethylbenzene	ug	2.41	2.76	0.56	0.56	5884842
m / p-Xylene	ug	11.4	13.0	0.60	0.60	5884842
Styrene	ug	2.70	2.74	0.48	0.48	5884842
o-Xylene	ug	4.25	4.94	0.60	0.60	5884842
Bromoform	ug	ND	ND	0.56	0.56	5884842
1,1,2,2-Tetrachloroethane	ug	ND	ND	0.56	0.56	5884842
Surrogate Recovery (%)						
Bromofluorobenzene	%	79	76			5884842
D4-1,2-Dichloroethane	%	92	90			5884842

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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VOLATILE ORGANICS BY GC/MS (STACK SAMPLING TRAIN)

Maxxam ID		INE337	INE338			
Sampling Date		2018/12/04	2018/12/04			
COC Number		30742	30742			
	UNITS	**M0030- BASELINE-T2-#3A/B**	**M0030- BASELINE-T3-#6A/B**	**RDL**	**MDL**	**QC Batch**
D8-Toluene	%	81	77			5884842

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8X0018
Report Date: 2018/12/20

RWDI Air Inc
Site Location: ST. MARYS

TEST SUMMARY

Maxxam ID: INA543
Sample ID: M0030- BLANK- #2A/B
Matrix: Stack Sampling Train

Collected:
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	5884842	N/A	2018/12/12	Yujie Yan

Maxxam ID: INA544
Sample ID: M0030- ALTFUEL- T1-#1A/B
Matrix: Stack Sampling Train

Collected: 2018/12/04
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	5884842	N/A	2018/12/12	Yujie Yan

Maxxam ID: INA545
Sample ID: M0030- ALTFUEL- T2-#8A/B
Matrix: Stack Sampling Train

Collected: 2018/12/04
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	5884842	N/A	2018/12/12	Yujie Yan

Maxxam ID: INA546
Sample ID: M0030- ALTFUEL- T3-#10A/B
Matrix: Stack Sampling Train

Collected: 2018/12/04
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	5884842	N/A	2018/12/12	Yujie Yan

Maxxam ID: INE336
Sample ID: M0030- BASELINE- T1-#5A/B
Matrix: Stack Sampling Train

Collected: 2018/12/04
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	5884842	N/A	2018/12/12	Yujie Yan

Maxxam ID: INE337
Sample ID: M0030- BASELINE- T2-#3A/B
Matrix: Stack Sampling Train

Collected: 2018/12/04
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	5884842	N/A	2018/12/12	Yujie Yan

Maxxam ID: INE338
Sample ID: M0030- BASELINE- T3-#6A/B
Matrix: Stack Sampling Train

Collected: 2018/12/04
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	5884842	N/A	2018/12/12	Yujie Yan

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GENERAL COMMENTS

In the continuing calibration standard, Chloromethane exceeded the acceptance limit of 20%. The reference standard was acceptable. Data should not be affected.

Sample INA544 [M0030- ALTFUEL- T1-#1A/B] : D4-1,2-Dichloroethane surrogate recovery exceeded acceptance range of 133% and D8-toluene surrogate recovery exceeded the acceptance limit of 121% due to hydrocarbon interference.
Chloromethane, Acetone, Benzene, Toluene, Ethylbenzene, m/p-Xylene, Styrene and o-Xylene exceed calibration range in this sample, results for these analytes are estimates only.

Sample INA545 [M0030- ALTFUEL- T2-#8A/B] : Sample was analyzed at a 40X dilution. The DLs were adjusted accordingly.
No d10-ethylbenzene surrogate recovery due to high dilution.

Sample INA546 [M0030- ALTFUEL- T3-#10A/B] : Sample was analyzed at a 40X dilution. The DLs were adjusted accordingly.
No d10-ethylbenzene surrogate recovery due to high dilution.

Sample INE336 [M0030- BASELINE- T1-#5A/B] : Sample was analyzed at a 40X dilution. The DLs were adjusted accordingly.
No d10-ethylbenzene surrogate recovery due to high dilution.

Sample INE337 [M0030- BASELINE- T2-#3A/B] : Sample was analyzed at a 40X dilution. The DLs were adjusted accordingly.
No d10-ethylbenzene surrogate recovery due to high dilution.

Sample INE338 [M0030- BASELINE- T3-#6A/B] : Sample was analyzed at a 40X dilution. The DLs were adjusted accordingly.
No d10-ethylbenzene surrogate recovery due to high dilution.

Results relate only to the items tested.

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Maxxam Job #: B8X0018
Report Date: 2018/12/20

RWDI Air Inc
Site Location: ST. MARYS

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5884842	YYA	Spiked Blank	Bromofluorobenzene	2018/12/12		100	%	43 - 131
			D10-Ethylbenzene (FS)	2018/12/12		99	%	47 - 157
			D4-1,2-Dichloroethane	2018/12/12		100	%	64 - 133
			D8-Toluene	2018/12/12		94	%	68 - 121
			Chloromethane	2018/12/12		107	%	50 - 150
			Vinyl Chloride	2018/12/12		94	%	50 - 150
			Bromomethane	2018/12/12		108	%	50 - 150
			Chloroethane	2018/12/12		91	%	50 - 150
			Acetone (2-Propanone)	2018/12/12		99	%	50 - 150
			1,1-Dichloroethylene	2018/12/12		105	%	50 - 150
			Methylene Chloride(Dichloromethane)	2018/12/12		99	%	50 - 150
			1,1-Dichloroethane	2018/12/12		107	%	50 - 150
			trans-1,2-Dichloroethylene	2018/12/12		85	%	50 - 150
			cis-1,2-Dichloroethylene	2018/12/12		105	%	50 - 150
			Chloroform	2018/12/12		106	%	50 - 150
			1,2-Dichloroethane	2018/12/12		105	%	50 - 150
			Methyl Ethyl Ketone (2-Butanone)	2018/12/12		99	%	50 - 150
			1,1,1-Trichloroethane	2018/12/12		107	%	50 - 150
			Carbon Tetrachloride	2018/12/12		110	%	50 - 150
			Benzene	2018/12/12		102	%	50 - 150
			1,1,2-Trichloroethane	2018/12/12		103	%	50 - 150
			1,2-Dichloropropane	2018/12/12		101	%	50 - 150
			Trichloroethylene	2018/12/12		95	%	50 - 150
			Bromodichloromethane	2018/12/12		108	%	50 - 150
			Dibromochloromethane	2018/12/12		111	%	50 - 150
			Toluene	2018/12/12		102	%	50 - 150
			Ethylene Dibromide	2018/12/12		102	%	50 - 150
			Tetrachloroethylene	2018/12/12		105	%	50 - 150
			Chlorobenzene	2018/12/12		102	%	50 - 150
			1,1,1,2-Tetrachloroethane	2018/12/12		110	%	50 - 150
			Ethylbenzene	2018/12/12		103	%	50 - 150
			m / p-Xylene	2018/12/12		103	%	50 - 150
			Styrene	2018/12/12		103	%	50 - 150
			o-Xylene	2018/12/12		103	%	50 - 150
			Bromoform	2018/12/12		113	%	50 - 150
			1,1,2,2-Tetrachloroethane	2018/12/12		121	%	50 - 150
5884842	YYA	Method Blank	Bromofluorobenzene	2018/12/12		103	%	43 - 131
			D10-Ethylbenzene (FS)	2018/12/12		96	%	47 - 157
			D4-1,2-Dichloroethane	2018/12/12		108	%	64 - 133
			D8-Toluene	2018/12/12		98	%	68 - 121
			Chloromethane	2018/12/12	ND, RDL=0.015		ug	
			Vinyl Chloride	2018/12/12	ND, RDL=0.013		ug	
			Bromomethane	2018/12/12	ND, RDL=0.015		ug	
			Chloroethane	2018/12/12	ND, RDL=0.0090		ug	
			Acetone (2-Propanone)	2018/12/12	ND, RDL=0.045		ug	
			1,1-Dichloroethylene	2018/12/12	ND, RDL=0.011		ug	
			Methylene Chloride(Dichloromethane)	2018/12/12	ND, RDL=0.019		ug	

Maxxam Job #: B8X0018
Report Date: 2018/12/20

RWDI Air Inc
Site Location: ST. MARYS

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,1-Dichloroethane	2018/12/12	ND, RDL=0.012		ug	
			trans-1,2-Dichloroethylene	2018/12/12	ND, RDL=0.010		ug	
			cis-1,2-Dichloroethylene	2018/12/12	ND, RDL=0.010		ug	
			Chloroform	2018/12/12	ND, RDL=0.011		ug	
			1,2-Dichloroethane	2018/12/12	ND, RDL=0.0070		ug	
			Methyl Ethyl Ketone (2-Butanone)	2018/12/12	ND, RDL=0.036		ug	
			1,1,1-Trichloroethane	2018/12/12	ND, RDL=0.014		ug	
			Carbon Tetrachloride	2018/12/12	ND, RDL=0.016		ug	
			Benzene	2018/12/12	ND, RDL=0.0090		ug	
			1,1,2-Trichloroethane	2018/12/12	ND, RDL=0.016		ug	
			1,2-Dichloropropane	2018/12/12	ND, RDL=0.011		ug	
			Trichloroethylene	2018/12/12	ND, RDL=0.011		ug	
			Bromodichloromethane	2018/12/12	ND, RDL=0.011		ug	
			Dibromochloromethane	2018/12/12	ND, RDL=0.0090		ug	
			Toluene	2018/12/12	ND, RDL=0.014		ug	
			Ethylene Dibromide	2018/12/12	ND, RDL=0.010		ug	
			Tetrachloroethylene	2018/12/12	ND, RDL=0.018		ug	
			Chlorobenzene	2018/12/12	ND, RDL=0.011		ug	
			1,1,1,2-Tetrachloroethane	2018/12/12	ND, RDL=0.010		ug	
			Ethylbenzene	2018/12/12	ND, RDL=0.014		ug	
			m / p-Xylene	2018/12/12	ND, RDL=0.015		ug	
			Styrene	2018/12/12	ND, RDL=0.012		ug	
			o-Xylene	2018/12/12	ND, RDL=0.015		ug	
			Bromoform	2018/12/12	ND, RDL=0.014		ug	
			1,1,2,2-Tetrachloroethane	2018/12/12	ND, RDL=0.014		ug	

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Maureen Smith

Maureen Smith, Supervisor, Volatiles

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Chain of Custody Form - AIR

30742

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B8X0018 (VOST)

CAM FCD-01302 /2

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ANALYSIS REQUESTED

CLIENT INFORMATION SECTION

Company Name: RWDI
Project Manager:
e-mail:
Address:
Phone: Fax:
Sampled by:

Analysis requested columns: ENV. CANADA RM 12 | USEPA M26 | U.S. EPA SW846 0030 VOST

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time	ENV. CANADA RM 12	USEPA M26	U.S. EPA SW846 0030 VOST
SVOC-ALF-T1 (6 SAMPLES)			12/04		✓		
SVOC-ALF-T2			12/05		✓		
SVOC-ALF-T3			12/06		✓		
SVOC-BASELINE-T1			12/07		✓		
SVOC-BASELINE-T2			12/07		✓		
SVOC-BASELINE-T3			12/08		✓		
SVOC-BLANK			[illegible]		✓		
M26-T1-T3-ALF (3 SAMPLES)			12/04-06			✓	
M26-T1-T3-BASELINE (3 SAMPLES)			12/07-08			✓	
VOST-T1-T3-ALF (6 SAMPLES)			12/04-06				✓
VOST-T1-T3-BASELINE (6 SAMPLES)			12/07-08				✓
VOST BLANK			N/A				✓

TAT Requirement
STD 10 Business day ☑
Rush 5 Business day * ☐
Rush 2 Business day * ☐
* need approval from Maxxam

PROJECT INFORMATION
Project #:
Name:
PO #:
Maxxam Quote #:
Maxxam Contact:

REPORTING REQUIREMENTS
Summary Report only ☐
EDD ☐
Regulation

Notes
Please note if this samples are "Industrial Hygiene" samples
If submitting dustfall samples, please indicate the diameter of the jar opening in cm.
PROJECT SPECIFIC COMMENTS

Client Signature:
Affiliation:
Date/Time:

Received by: See Page 1
Affiliation:
Date/Time:

COC-1031 (11/2017)

[illegible] 2018/12/10 10:21 5.3/5.7/6.2 °C 12.0/17.7/13.1

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

SAMPLE#:	Method Blank
Field ID#:	Method Blank

Number of TICs found:_____0_____

Concentration Units
ug

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		Cumene < 0.025ug			

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

SAMPLE#: IAK606

Field ID#: M0030-BLANK-#3A/B

Number of TICs found:_____0_____

Concentration Units
ug

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		Cumene < 0.025ug			

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

SAMPLE#: IAK607

Field ID#: M0030-T1-#8A/B

Number of TICs found:_____1_____

Concentration Units
ug

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.	98-82-8	Cumene	11.96	0.27	

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

SAMPLE#: IAK608

Field ID#: M0030-T2-#9A/B

Number of TICs found:_____0_____

Concentration Units
ug

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		Cumene < 1 ug			

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

SAMPLE#: IAK621

Field ID#: M0030-T3-#1A/B

Number of TICs found:_____0_____

Concentration Units
ug

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		Cumene < 1 ug			

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

SAMPLE#: Method Blank

Field ID#: Method Blank

Number of TICs found:_____0_____

Concentration Units
ug

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		1,3-Butadiene < 0.025 ug			
2.		Trichlorotrifluoroethane < 0.025 ug			
3.		Cumene < 0.025 ug			
4.		1,3,5-Trimethylbenzene < 0.025 ug			

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

SAMPLE#: HYT930

Field ID#: M0030-T1-#9A/B

Number of TICs found:_____3_____

Concentration Units
ug

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.	106-99-0	1,3-Butadiene	4.41	1.03	
2.		Trichlorotrifluoroethane < 0.025			
3.	98-82-8	Cumene	11.99	0.19	
4.	108-67-8	1,3,5-Trimethylbenzene	12.79	1.7	

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

SAMPLE#: HYT931

Field ID#: M0030-T2-#8A/B

Number of TICs found:_____2_____

Concentration Units
ug

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.	106-99-0	1,3-Butadiene	4.44	0.79	
2.		Trichlorotrifluoroethane < 0.5			
3.		Cumene < 0.5 ug			
4.	108-67-8	1,3,5-Trimethylbenzene	12.75	2.9	

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

SAMPLE#: HYT932

Field ID#: M0030-T3-#7A/B

Number of TICs found:_____2_____

Concentration Units
ug

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.	106-99-0	1,3-Butadiene	4.42	0.96	
2.		Trichlorotrifluoroethane < 0.5			
3.		Cumene < 0.5 ug			
4.	108-67-8	1,3,5-Trimethylbenzene	12.75	3.3	

Your P.O. #: 1804600
Your Project #: 1804600
Site Location: ST. MARYS
Your C.O.C. #: 32138

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/10/24
Report #: R5454573
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8R2640
Received: 2018/10/15, 15:21

Sample Matrix: Stack Sampling Train
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
VOST EPA5041A, 8260C for 0030, 0031	4	N/A	2018/10/17	BRL SOP-00302	EPA5041A, 8260C

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B8R2640
Report Date: 2018/10/24

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

VOLATILE ORGANICS BY GC/MS (STACK SAMPLING TRAIN)

Maxxam ID		IAK606	IAK607			
Sampling Date		2018/10/12	2018/10/12			
COC Number		32138	32138			
	UNITS	**M0030- BLANK- #3A/B**	**M0030- T1- #8A/B**	**RDL**	**MDL**	**QC Batch**
Chloromethane	ug	ND	5.72	0.015	0.015	5787976
Vinyl Chloride	ug	ND	0.165	0.013	0.013	5787976
Bromomethane	ug	ND	0.215	0.015	0.015	5787976
Chloroethane	ug	ND	0.632	0.0090	0.0090	5787976
Acetone (2-Propanone)	ug	ND	7.71	0.045	0.025	5787976
1,1-Dichloroethylene	ug	ND	ND	0.011	0.011	5787976
Methylene Chloride(Dichloromethane)	ug	ND	ND	0.019	0.020	5787976
1,1-Dichloroethane	ug	ND	ND	0.012	0.012	5787976
trans-1,2-Dichloroethylene	ug	ND	ND	0.010	0.010	5787976
cis-1,2-Dichloroethylene	ug	ND	ND	0.010	0.010	5787976
Chloroform	ug	ND	ND	0.011	0.011	5787976
1,2-Dichloroethane	ug	ND	ND	0.0070	0.0070	5787976
Methyl Ethyl Ketone (2-Butanone)	ug	ND	ND	0.036	0.036	5787976
1,1,1-Trichloroethane	ug	ND	ND	0.014	0.014	5787976
Carbon Tetrachloride	ug	ND	ND	0.016	0.016	5787976
Benzene	ug	ND	7.29	0.0090	0.0090	5787976
1,1,2-Trichloroethane	ug	ND	ND	0.016	0.016	5787976
1,2-Dichloropropane	ug	ND	ND	0.011	0.011	5787976
Trichloroethylene	ug	ND	ND	0.011	0.011	5787976
Bromodichloromethane	ug	ND	ND	0.011	0.011	5787976
Dibromochloromethane	ug	ND	ND	0.0090	0.0090	5787976
Toluene	ug	ND	3.51	0.014	0.014	5787976
Ethylene Dibromide	ug	ND	ND	0.010	0.010	5787976
Tetrachloroethylene	ug	ND	ND	0.018	0.018	5787976
Chlorobenzene	ug	ND	0.518	0.011	0.011	5787976
1,1,1,2-Tetrachloroethane	ug	ND	ND	0.010	0.010	5787976
Ethylbenzene	ug	ND	1.60	0.014	0.014	5787976
m / p-Xylene	ug	ND	5.51	0.015	0.015	5787976
Styrene	ug	ND	1.87	0.012	0.012	5787976
o-Xylene	ug	ND	2.11	0.015	0.015	5787976
Bromoform	ug	ND	ND	0.014	0.014	5787976
1,1,2,2-Tetrachloroethane	ug	ND	ND	0.014	0.014	5787976

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B8R2640
Report Date: 2018/10/24

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

VOLATILE ORGANICS BY GC/MS (STACK SAMPLING TRAIN)

Maxxam ID		IAK606	IAK607			
Sampling Date		2018/10/12	2018/10/12			
COC Number		32138	32138			
	UNITS	**M0030- BLANK-#3A/B**	**M0030- T1-#8A/B**	**RDL**	**MDL**	**QC Batch**
Surrogate Recovery (%)						
Bromofluorobenzene	%	107	91			5787976
D10-Ethylbenzene (FS)	%	101	133			5787976
D4-1,2-Dichloroethane	%	101	338 (1)			5787976
D8-Toluene	%	98	122 (1)			5787976

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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Maxxam Job #: B8R2640
Report Date: 2018/10/24

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

VOLATILE ORGANICS BY GC/MS (STACK SAMPLING TRAIN)

Maxxam ID		IAK608	IAK621			
Sampling Date		2018/10/12	2018/10/12			
COC Number		32138	32138			
	UNITS	**M0030- T2-#9A/B**	**M0030- T3-#1A/B**	**RDL**	**MDL**	**QC Batch**
Chloromethane	ug	3.60	3.51	0.60	0.60	5787976
Vinyl Chloride	ug	ND	ND	0.52	0.52	5787976
Bromomethane	ug	ND	ND	0.60	0.60	5787976
Chloroethane	ug	0.39	0.59	0.36	0.36	5787976
Acetone (2-Propanone)	ug	5.7	3.7	1.8	1.0	5787976
1,1-Dichloroethylene	ug	ND	ND	0.44	0.44	5787976
Methylene Chloride(Dichloromethane)	ug	ND	ND	0.76	0.80	5787976
1,1-Dichloroethane	ug	ND	ND	0.48	0.48	5787976
trans-1,2-Dichloroethylene	ug	ND	ND	0.40	0.40	5787976
cis-1,2-Dichloroethylene	ug	ND	ND	0.40	0.40	5787976
Chloroform	ug	ND	ND	0.44	0.44	5787976
1,2-Dichloroethane	ug	ND	ND	0.28	0.28	5787976
Methyl Ethyl Ketone (2-Butanone)	ug	ND	ND	1.4	1.4	5787976
1,1,1-Trichloroethane	ug	ND	ND	0.56	0.56	5787976
Carbon Tetrachloride	ug	ND	ND	0.64	0.64	5787976
Benzene	ug	22.4	19.9	0.36	0.36	5787976
1,1,2-Trichloroethane	ug	ND	ND	0.64	0.64	5787976
1,2-Dichloropropane	ug	ND	ND	0.44	0.44	5787976
Trichloroethylene	ug	ND	ND	0.44	0.44	5787976
Bromodichloromethane	ug	ND	ND	0.44	0.44	5787976
Dibromochloromethane	ug	ND	ND	0.36	0.36	5787976
Toluene	ug	13.5	13.6	0.56	0.56	5787976
Ethylene Dibromide	ug	ND	ND	0.40	0.40	5787976
Tetrachloroethylene	ug	ND	ND	0.72	0.72	5787976
Chlorobenzene	ug	0.46	0.46	0.44	0.44	5787976
1,1,1,2-Tetrachloroethane	ug	ND	ND	0.40	0.40	5787976
Ethylbenzene	ug	2.58	2.72	0.56	0.56	5787976
m / p-Xylene	ug	10.7	11.4	0.60	0.60	5787976
Styrene	ug	2.92	2.85	0.48	0.48	5787976
o-Xylene	ug	4.04	4.41	0.60	0.60	5787976
Bromoform	ug	ND	ND	0.56	0.56	5787976
1,1,2,2-Tetrachloroethane	ug	ND	ND	0.56	0.56	5787976

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Maxxam Job #: B8R2640
Report Date: 2018/10/24

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

VOLATILE ORGANICS BY GC/MS (STACK SAMPLING TRAIN)

Maxxam ID		IAK608	IAK621			
Sampling Date		2018/10/12	2018/10/12			
COC Number		32138	32138			
	UNITS	**M0030- T2- #9A/B**	**M0030- T3- #1A/B**	**RDL**	**MDL**	**QC Batch**
Surrogate Recovery (%)						
Bromofluorobenzene	%	65	70			5787976
D4-1,2-Dichloroethane	%	93	85			5787976
D8-Toluene	%	76	70			5787976

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8R2640
Report Date: 2018/10/24

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

TEST SUMMARY

Maxxam ID: IAK606
Sample ID: M0030- BLANK- #3A/B
Matrix: Stack Sampling Train

Collected: 2018/10/12
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	5787976	N/A	2018/10/17	Melanie Mabini

Maxxam ID: IAK607
Sample ID: M0030- T1- #8A/B
Matrix: Stack Sampling Train

Collected: 2018/10/12
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	5787976	N/A	2018/10/17	Melanie Mabini

Maxxam ID: IAK608
Sample ID: M0030- T2- #9A/B
Matrix: Stack Sampling Train

Collected: 2018/10/12
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	5787976	N/A	2018/10/17	Melanie Mabini

Maxxam ID: IAK621
Sample ID: M0030- T3- #1A/B
Matrix: Stack Sampling Train

Collected: 2018/10/12
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	5787976	N/A	2018/10/17	Melanie Mabini

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Maxxam Job #: B8R2640
Report Date: 2018/10/24

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

GENERAL COMMENTS

In the continuing calibration standard chloromethane exceed the acceptance limit of 20%.

Sample IAK607 [M0030- T1- #8A/B] : Difluorobenzene internal recovery was less than 50% due to matrix interference. Data calculated with this internal standard will be biased high.
D4-1,2-Dichloroethane surrogate recovery exceeded acceptance range of 133% and d8-Toluene surrogate recovery exceeded acceptance range of 121% due to hydrocarbon interference.
Chloromethane, Acetone, Benzene, Toluene, Ethylbenzene, m/p-Xylene, Styrene and o-Xylene exceed calibration range in this sample, results for these analytes are estimates only.

Sample IAK608 [M0030- T2- #9A/B] : Sample was analyzed at a 40X dilution. The DLs were adjusted accordingly.
No d10-ethylbenzene surrogate recovery due to high dilution.

Sample IAK621 [M0030- T3- #1A/B] : Sample was analyzed at a 40X dilution. The DLs were adjusted accordingly.
No d10-ethylbenzene surrogate recovery due to high dilution.

Results relate only to the items tested.

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Maxxam Job #: B8R2640
Report Date: 2018/10/24

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5787976	MM2	Spiked Blank	Bromofluorobenzene	2018/10/17		105	%	43 - 131
			D10-Ethylbenzene (FS)	2018/10/17		86	%	47 - 157
			D4-1,2-Dichloroethane	2018/10/17		95	%	64 - 133
			D8-Toluene	2018/10/17		92	%	68 - 121
			Chloromethane	2018/10/17		89	%	50 - 150
			Vinyl Chloride	2018/10/17		93	%	50 - 150
			Bromomethane	2018/10/17		100	%	50 - 150
			Chloroethane	2018/10/17		93	%	50 - 150
			Acetone (2-Propanone)	2018/10/17		111	%	50 - 150
			1,1-Dichloroethylene	2018/10/17		98	%	50 - 150
			Methylene Chloride(Dichloromethane)	2018/10/17		93	%	50 - 150
			1,1-Dichloroethane	2018/10/17		105	%	50 - 150
			trans-1,2-Dichloroethylene	2018/10/17		103	%	50 - 150
			cis-1,2-Dichloroethylene	2018/10/17		103	%	50 - 150
			Chloroform	2018/10/17		104	%	50 - 150
			1,2-Dichloroethane	2018/10/17		101	%	50 - 150
			Methyl Ethyl Ketone (2-Butanone)	2018/10/17		109	%	50 - 150
			1,1,1-Trichloroethane	2018/10/17		105	%	50 - 150
			Carbon Tetrachloride	2018/10/17		107	%	50 - 150
			Benzene	2018/10/17		104	%	50 - 150
			1,1,2-Trichloroethane	2018/10/17		101	%	50 - 150
			1,2-Dichloropropane	2018/10/17		103	%	50 - 150
			Trichloroethylene	2018/10/17		97	%	50 - 150
			Bromodichloromethane	2018/10/17		105	%	50 - 150
			Dibromochloromethane	2018/10/17		105	%	50 - 150
			Toluene	2018/10/17		97	%	50 - 150
			Ethylene Dibromide	2018/10/17		100	%	50 - 150
			Tetrachloroethylene	2018/10/17		103	%	50 - 150
			Chlorobenzene	2018/10/17		101	%	50 - 150
			1,1,1,2-Tetrachloroethane	2018/10/17		105	%	50 - 150
			Ethylbenzene	2018/10/17		101	%	50 - 150
			m / p-Xylene	2018/10/17		101	%	50 - 150
			Styrene	2018/10/17		104	%	50 - 150
			o-Xylene	2018/10/17		102	%	50 - 150
			Bromoform	2018/10/17		102	%	50 - 150
			1,1,2,2-Tetrachloroethane	2018/10/17		117	%	50 - 150
5787976	MM2	Method Blank	Bromofluorobenzene	2018/10/17		110	%	43 - 131
			D10-Ethylbenzene (FS)	2018/10/17		103	%	47 - 157
			D4-1,2-Dichloroethane	2018/10/17		106	%	64 - 133
			D8-Toluene	2018/10/17		98	%	68 - 121
			Chloromethane	2018/10/17	ND, RDL=0.015		ug	
			Vinyl Chloride	2018/10/17	ND, RDL=0.013		ug	
			Bromomethane	2018/10/17	ND, RDL=0.015		ug	
			Chloroethane	2018/10/17	ND, RDL=0.0090		ug	
			Acetone (2-Propanone)	2018/10/17	ND, RDL=0.045		ug	
			1,1-Dichloroethylene	2018/10/17	ND, RDL=0.011		ug	

Maxxam Job #: B8R2640
Report Date: 2018/10/24

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Methylene Chloride(Dichloromethane)	2018/10/17	ND, RDL=0.019		ug	
			1,1-Dichloroethane	2018/10/17	ND, RDL=0.012		ug	
			trans-1,2-Dichloroethylene	2018/10/17	ND, RDL=0.010		ug	
			cis-1,2-Dichloroethylene	2018/10/17	ND, RDL=0.010		ug	
			Chloroform	2018/10/17	ND, RDL=0.011		ug	
			1,2-Dichloroethane	2018/10/17	ND, RDL=0.0070		ug	
			Methyl Ethyl Ketone (2-Butanone)	2018/10/17	ND, RDL=0.036		ug	
			1,1,1-Trichloroethane	2018/10/17	ND, RDL=0.014		ug	
			Carbon Tetrachloride	2018/10/17	ND, RDL=0.016		ug	
			Benzene	2018/10/17	ND, RDL=0.0090		ug	
			1,1,2-Trichloroethane	2018/10/17	ND, RDL=0.016		ug	
			1,2-Dichloropropane	2018/10/17	ND, RDL=0.011		ug	
			Trichloroethylene	2018/10/17	ND, RDL=0.011		ug	
			Bromodichloromethane	2018/10/17	ND, RDL=0.011		ug	
			Dibromochloromethane	2018/10/17	ND, RDL=0.0090		ug	
			Toluene	2018/10/17	ND, RDL=0.014		ug	
			Ethylene Dibromide	2018/10/17	ND, RDL=0.010		ug	
			Tetrachloroethylene	2018/10/17	ND, RDL=0.018		ug	
			Chlorobenzene	2018/10/17	ND, RDL=0.011		ug	
			1,1,1,2-Tetrachloroethane	2018/10/17	ND, RDL=0.010		ug	
			Ethylbenzene	2018/10/17	ND, RDL=0.014		ug	
			m / p-Xylene	2018/10/17	ND, RDL=0.015		ug	
			Styrene	2018/10/17	ND, RDL=0.012		ug	
			o-Xylene	2018/10/17	ND, RDL=0.015		ug	
			Bromoform	2018/10/17	ND, RDL=0.014		ug	

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Maxxam Job #: B8R2640
Report Date: 2018/10/24

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,1,2,2-Tetrachloroethane	2018/10/17	ND, RDL=0.014		ug	

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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Maxxam Job #: B8R2640
Report Date: 2018/10/24

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Maureen Smith

Maureen Smith, Supervisor, Volatiles

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(VOST) B8R2640

Chain of Custody Form - AIR

11570

Maxxam 6740 Campobello Rd, Mississauga Ontario, L5N 2L8, www.maxxamanalytics.com
Toll Free: 1-800-668-0639 Phone: (905) 817-5700 Fax: (905) 817-5777

Page 2 of 2

CLIENT INFORMATION SECTION

Company Name: RWDI
Project Manager: Kirk Easto
e-mail:
Address:

Phone: Fax:
Sampled by:

ANALYSIS REQUESTED

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time	ENVIRONMENT CANADA RM/2	USEPA METHOD 26	USEPA SW846 0030 VOST										
SVOC-BLANK (6PCS)					✓												
M26-BLANK						✓											
VOST-BLANK							✓										
VOST-ALT FUELS-T_1			10/12/15				✓										
VOST-ALT FUELS-T_2			10/12/15				✓										
VOST-ALT FUELS-T_3			10/12/15				✓										

TAT Requirement
STD 10 Business day ☐
Rush 5 Business day * ☐
Rush 2 Business day * ☐
* need approval from Maxxam

PROJECT INFORMATION
Project #: 1504600
Name:
PO #: 1504600
Maxxam Quote #:
Maxxam Contact:

REPORTING REQUIREMENTS
Summary Report only ☐
EDD ☐
Regulation

Notes

PROJECT SPECIFIC COMMENTS

Client Signature:
Affiliation:
Date/Time:

Received by: See page 2 one JL 18/10/15
Affiliation:
Date/Time:

COC-1031 (04/13) - Air

Your P.O. #: 1804600
Your Project #: 1804600
Site Location: ST. MARYS
Your C.O.C. #: 32138

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2019/03/06
Report #: R5617993
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B8Q5238
Received: 2018/10/06, 10:30

Sample Matrix: Stack Sampling Train
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
VOST EPA5041A, 8260C for 0030, 0031	3	N/A	2018/10/11	BRL SOP-00302	EPA5041A, 8260C

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B8Q5238
Report Date: 2019/03/06

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

VOLATILE ORGANICS BY GC/MS (STACK SAMPLING TRAIN)

Maxxam ID		HYT930		HYT931		HYT932		
Sampling Date		2018/09/30		2018/10/01		2018/10/02		
COC Number		32138		32138		32138		
	UNITS	**M0030- T1- #9A/B**	**RDL**	**M0030- T2- #8A/B**	**RDL**	**M0030- T3- #7A/B**	**RDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug	ND	0.020	ND	0.40	ND	0.40	5777722
Chloromethane	ug	4.48	0.015	5.06	0.30	4.98	0.30	5777722
Vinyl Chloride	ug	ND	0.013	ND	0.26	ND	0.26	5777722
Bromomethane	ug	0.378	0.015	0.43	0.30	ND	0.30	5777722
Chloroethane	ug	0.750	0.0090	0.43	0.18	0.46	0.18	5777722
Trichlorofluoromethane (FREON 11)	ug	ND	0.010	ND	0.20	ND	0.20	5777722
Acetone (2-Propanone)	ug	5.94	0.045	6.34	0.90	7.21	0.90	5777722
1,1-Dichloroethylene	ug	ND	0.011	ND	0.22	ND	0.22	5777722
Methylene Chloride(Dichloromethane)	ug	ND	0.019	ND	0.38	ND	0.38	5777722
1,1-Dichloroethane	ug	ND	0.012	ND	0.24	ND	0.24	5777722
trans-1,2-Dichloroethylene	ug	ND	0.010	ND	0.20	ND	0.20	5777722
cis-1,2-Dichloroethylene	ug	ND	0.010	ND	0.20	ND	0.20	5777722
Chloroform	ug	ND	0.011	ND	0.22	ND	0.22	5777722
1,2-Dichloroethane	ug	ND	0.0070	ND	0.14	ND	0.14	5777722
Methyl Ethyl Ketone (2-Butanone)	ug	ND	0.036	ND	0.72	ND	0.72	5777722
1,1,1-Trichloroethane	ug	ND	0.014	ND	0.28	ND	0.28	5777722
Carbon Tetrachloride	ug	ND	0.016	ND	0.32	ND	0.32	5777722
Benzene	ug	6.78	0.0090	19.4	0.18	21.9 (1)	0.36	5777722
1,1,2-Trichloroethane	ug	ND	0.016	ND	0.32	ND	0.32	5777722
1,2-Dichloropropane	ug	ND	0.011	ND	0.22	ND	0.22	5777722
Trichloroethylene	ug	ND	0.011	ND	0.22	ND	0.22	5777722
Bromodichloromethane	ug	ND	0.011	ND	0.22	ND	0.22	5777722
Dibromochloromethane	ug	ND	0.0090	ND	0.18	ND	0.18	5777722
Toluene	ug	2.88	0.014	12.2	0.28	12.6	0.28	5777722
Ethylene Dibromide	ug	ND	0.010	ND	0.20	ND	0.20	5777722
Tetrachloroethylene	ug	ND	0.018	ND	0.36	ND	0.36	5777722
Chlorobenzene	ug	0.393	0.011	0.33	0.22	0.39	0.22	5777722
1,1,1,2-Tetrachloroethane	ug	ND	0.010	ND	0.20	ND	0.20	5777722
Ethylbenzene	ug	1.42	0.014	2.36	0.28	2.62	0.28	5777722
m / p-Xylene	ug	4.49	0.015	9.38	0.30	10.4	0.30	5777722
Styrene	ug	1.48	0.012	2.42	0.24	2.87	0.24	5777722
o-Xylene	ug	1.77	0.015	3.75	0.30	4.01	0.30	5777722
Bromoform	ug	ND	0.014	ND	0.28	ND	0.28	5777722

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
(1) was analyzed at a 40X dilution. The DLs were adjusted accordingly.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B8Q5238
Report Date: 2019/03/06

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

VOLATILE ORGANICS BY GC/MS (STACK SAMPLING TRAIN)

Maxxam ID		HYT930		HYT931		HYT932		
Sampling Date		2018/09/30		2018/10/01		2018/10/02		
COC Number		32138		32138		32138		
	UNITS	**M0030- T1-#9A/B**	**RDL**	**M0030- T2-#8A/B**	**RDL**	**M0030- T3-#7A/B**	**RDL**	**QC Batch**
1,1,2,2-Tetrachloroethane	ug	ND	0.014	ND	0.28	ND	0.28	5777722
Surrogate Recovery (%)								
Bromofluorobenzene	%	81		66		73		5777722
D10-Ethylbenzene (FS)	%	145		115		148		5777722
D4-1,2-Dichloroethane	%	282 (1)		91		100		5777722
D8-Toluene	%	106		71		78		5777722

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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Maxxam Job #: B8Q5238
Report Date: 2019/03/06

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

TEST SUMMARY

Maxxam ID: HYT930
Sample ID: M0030- T1- #9A/B
Matrix: Stack Sampling Train

Collected: 2018/09/30
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	5777722	N/A	2018/10/11	Yujie Yan

Maxxam ID: HYT931
Sample ID: M0030- T2- #8A/B
Matrix: Stack Sampling Train

Collected: 2018/10/01
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	5777722	N/A	2018/10/11	Yujie Yan

Maxxam ID: HYT932
Sample ID: M0030- T3- #7A/B
Matrix: Stack Sampling Train

Collected: 2018/10/02
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	5777722	N/A	2018/10/11	Yujie Yan

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B8Q5238
Report Date: 2019/03/06

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

GENERAL COMMENTS

In the continuing calibration standard 1,1,2,2-Tetrachloroethane exceed the acceptance limit of 20%.

Sample HYT930 [M0030- T1- #9A/B] : D4-1,2-Dichloroethane surrogate recovery exceed acceptance range of 133% due to hydrocarbon interference. Chloromethane, Acetone, Benzene, Toluene, Ethylbenzene, m/p-Xylene, Styrene and o-Xylene exceed calibration range in this sample, results for these analytes are estimates only.

Sample HYT931 [M0030- T2- #8A/B] : Sample was analyzed at a 20X dilution. The DLs were adjusted accordingly.

Sample HYT932 [M0030- T3- #7A/B] : Sample was analyzed at a 20X dilution. The DLs were adjusted accordingly.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5777722	YYA	Spiked Blank	Bromofluorobenzene	2018/10/11		100	%	43 - 131
			D10-Ethylbenzene (FS)	2018/10/11		95	%	47 - 157
			D4-1,2-Dichloroethane	2018/10/11		100	%	64 - 133
			D8-Toluene	2018/10/11		97	%	68 - 121
			Dichlorodifluoromethane (FREON 12)	2018/10/11		116	%	50 - 150
			Chloromethane	2018/10/11		115	%	50 - 150
			Vinyl Chloride	2018/10/11		104	%	50 - 150
			Bromomethane	2018/10/11		119	%	50 - 150
			Chloroethane	2018/10/11		103	%	50 - 150
			Trichlorofluoromethane (FREON 11)	2018/10/11		103	%	50 - 150
			Acetone (2-Propanone)	2018/10/11		134	%	50 - 150
			1,1-Dichloroethylene	2018/10/11		106	%	50 - 150
			Methylene Chloride(Dichloromethane)	2018/10/11		104	%	50 - 150
			1,1-Dichloroethane	2018/10/11		106	%	50 - 150
			trans-1,2-Dichloroethylene	2018/10/11		104	%	50 - 150
			cis-1,2-Dichloroethylene	2018/10/11		105	%	50 - 150
			Chloroform	2018/10/11		103	%	50 - 150
			1,2-Dichloroethane	2018/10/11		102	%	50 - 150
			Methyl Ethyl Ketone (2-Butanone)	2018/10/11		126	%	50 - 150
			1,1,1-Trichloroethane	2018/10/11		102	%	50 - 150
			Carbon Tetrachloride	2018/10/11		104	%	50 - 150
			Benzene	2018/10/11		102	%	50 - 150
			1,1,2-Trichloroethane	2018/10/11		100	%	50 - 150
			1,2-Dichloropropane	2018/10/11		102	%	50 - 150
			Trichloroethylene	2018/10/11		96	%	50 - 150
			Bromodichloromethane	2018/10/11		104	%	50 - 150
			Dibromochloromethane	2018/10/11		102	%	50 - 150
			Toluene	2018/10/11		100	%	50 - 150
			Ethylene Dibromide	2018/10/11		98	%	50 - 150
			Tetrachloroethylene	2018/10/11		100	%	50 - 150
			Chlorobenzene	2018/10/11		99	%	50 - 150
			1,1,1,2-Tetrachloroethane	2018/10/11		102	%	50 - 150
			Ethylbenzene	2018/10/11		100	%	50 - 150
			m / p-Xylene	2018/10/11		100	%	50 - 150
			Styrene	2018/10/11		101	%	50 - 150
			o-Xylene	2018/10/11		101	%	50 - 150
			Bromoform	2018/10/11		102	%	50 - 150
			1,1,2,2-Tetrachloroethane	2018/10/11		114	%	50 - 150
5777722	YYA	Method Blank	Bromofluorobenzene	2018/10/11		102	%	43 - 131
			D10-Ethylbenzene (FS)	2018/10/11		115	%	47 - 157
			D4-1,2-Dichloroethane	2018/10/11		107	%	64 - 133
			D8-Toluene	2018/10/11		101	%	68 - 121
			Dichlorodifluoromethane (FREON 12)	2018/10/11	ND, RDL=0.020		ug	
			Chloromethane	2018/10/11	ND, RDL=0.015		ug	
			Vinyl Chloride	2018/10/11	ND, RDL=0.013		ug	
			Bromomethane	2018/10/11	ND, RDL=0.015		ug	
			Chloroethane	2018/10/11	ND, RDL=0.0090		ug	

Maxxam Job #: B8Q5238
Report Date: 2019/03/06

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Trichlorofluoromethane (FREON 11)	2018/10/11	ND, RDL=0.010		ug	
			Acetone (2-Propanone)	2018/10/11	ND, RDL=0.045		ug	
			1,1-Dichloroethylene	2018/10/11	ND, RDL=0.011		ug	
			Methylene Chloride(Dichloromethane)	2018/10/11	ND, RDL=0.019		ug	
			1,1-Dichloroethane	2018/10/11	ND, RDL=0.012		ug	
			trans-1,2-Dichloroethylene	2018/10/11	ND, RDL=0.010		ug	
			cis-1,2-Dichloroethylene	2018/10/11	ND, RDL=0.010		ug	
			Chloroform	2018/10/11	ND, RDL=0.011		ug	
			1,2-Dichloroethane	2018/10/11	ND, RDL=0.0070		ug	
			Methyl Ethyl Ketone (2-Butanone)	2018/10/11	ND, RDL=0.036		ug	
			1,1,1-Trichloroethane	2018/10/11	ND, RDL=0.014		ug	
			Carbon Tetrachloride	2018/10/11	ND, RDL=0.016		ug	
			Benzene	2018/10/11	ND, RDL=0.0090		ug	
			1,1,2-Trichloroethane	2018/10/11	ND, RDL=0.016		ug	
			1,2-Dichloropropane	2018/10/11	ND, RDL=0.011		ug	
			Trichloroethylene	2018/10/11	ND, RDL=0.011		ug	
			Bromodichloromethane	2018/10/11	ND, RDL=0.011		ug	
			Dibromochloromethane	2018/10/11	ND, RDL=0.0090		ug	
			Toluene	2018/10/11	ND, RDL=0.014		ug	
			Ethylene Dibromide	2018/10/11	ND, RDL=0.010		ug	
			Tetrachloroethylene	2018/10/11	ND, RDL=0.018		ug	
			Chlorobenzene	2018/10/11	ND, RDL=0.011		ug	
			1,1,1,2-Tetrachloroethane	2018/10/11	ND, RDL=0.010		ug	
			Ethylbenzene	2018/10/11	ND, RDL=0.014		ug	
			m / p-Xylene	2018/10/11	ND, RDL=0.015		ug	
			Styrene	2018/10/11	ND, RDL=0.012		ug	
			o-Xylene	2018/10/11	ND, RDL=0.015		ug	

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Maxxam Job #: B8Q5238
Report Date: 2019/03/06

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Bromoform	2018/10/11	ND, RDL=0.014		ug	
			1,1,2,2-Tetrachloroethane	2018/10/11	ND, RDL=0.014		ug	

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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Maxxam Job #: B8Q5238
Report Date: 2019/03/06

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Maureen Smith

Maureen Smith, Supervisor, Volatiles

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Chain of Custody Form - Source

B8Q5238

Maxxam

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Mississauga, Ontario L5N 2L8
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Phone: (905) 817-5700
Fax: (905) 817-5775

CAM FCD-01303 /2 Page ____ of ____

CLIENT INFORMATION SECTION

Company Name: RWDI
Project Manager: Kirk Easto
e-mail: kirk.easto@rwdi.com
Address: Guelph, ON
Phone: 519-823-1311 Fax: 519-823-1316
Sampled by: Kirk Easto

ANALYSIS REQUESTED

MAXXAM use only	Field Sample ID	# Bottles	Collection Date	Collection Time	Initial Impinger Charge Volumes (mL)*	SVOC ENV/CAN 1/RM/2	US EPA M29	US EPA M26 HCl/NH3	Method 30 VOC's	US EPA M201A						
	T1-Baseline -SVOC (6 pieces)	6	Sept 30			x										
	T2-Baseline -SVOC (6 pieces)	6	Oct 1			x										
	T3-Baseline -SVOC (6 pieces)	6	Oct 2			x										
	T1-Baseline - M29 (7 pieces)	7	Sept 30				x									
	T2-Baseline - M29 (7 pieces)	7	Oct 1				x									
	T3-Baseline - M29 (7 pieces)	7	Oct 2				x									
	T1/T2/T3-Baseline -M26 (3 bottle)	3	09/30-10/032		2 * 15 ml			x								
	T1/T2/T3-Baseline -VOST (3 pairs)	3	09/30-10/032						X							
	T1-Baseline - PM10 (4pieces)	4	Sept 30							x						
	T2-Baseline - PM10 (4pieces)	4	Oct 1							x						
	T3-Baseline - PM10 (4pieces)	4	Oct 2							x						

TAT Requirement

- STD 10 Business day ☑
- Rush 5 Business day ☐
- Rush 2 Business day ☐
- Rush 1 Business day ☐
- Other (specify):

PROJECT INFORMATION

Project #: 1804600
Name: St. Marys
PO #: 1804600
Maxxam Quote #:
Maxxam Contact: Clayton Johnson

REPORTING REQUIREMENTS

SSAS Audit samples ☐
Summary Report only ☐
Summary Report & Raw Data Package ** ☐
** additional cost may apply

PROJECT SPECIFIC COMMENTS

See attached list for parameter lists

* Initial Impinger charge volumes are required before the following analysis can be started: Method 26, CTM-027 & Method 8

Client Signature: [signature]
Affiliation:
Date/Time: Oct 6 2018

Received by: FIDELE NTAMWEMEZI
Affiliation: [signature]
Date/Time: 2018/10/06 10:30

Method 23 / TO9A

2005 WHO ☐ TEF x DL ☐
1989 NATO TEF ☐ TEF x 0 DL ☐
1998 WHO ☐ TEF x 0.5 DL ☐

8.5/8.9/9.0

SCHEDULE "B2"

TEST CONTAMINANTS

Source Testing Program

Nitrogen Oxides
Sulphur Dioxide
Carbon Monoxide
Carbon Dioxide
Total Suspended Particulate Matter
PM 10
PM 2.5
Hydrogen Chloride
Ammonia
Calcium Oxide
Ferric Oxide

B8Q5238

Metals		Volatile Organic Matter
Cd	Cadmium	acetone
Be	Beryllium	benzene
Pb	Lead	bromodichloromethane
Mo	Molybdenum	bromoform
Cr	Chromium	bromomethane
Ni	Nickel	butanone, 2 -
V	Vanadium	carbon tetrachloride
Al	Aluminum	chlorobenzene
Ti	Titanium	chloroethane
Mg	Magnesium	chloroform
B	Boron	chloromethane
Ba	Barium	cumene (isopropyl benzene)
P	Phosphorus	dibromochloromethane
K	Potassium	dichloroethane, 1,1 -
Hg	Mercury	dichloroethane, 1,2 -
As	Arsenic	dichloroethene, trans - 1,2 -
Zn	Zinc	dichloroethene, 1,1 – (vinyl chloride)
Sb	Antimony	dichloroethylene, cis - 1,2 -
Mn	Manganese	dichloropropane, 1,2 -
Co	Cobalt	ethylbenzene
Se	Selenium	ethylene dibromide (1,2-dibromoethane)
Cu	Copper	methylene chloride
Ag	Silver	styrene
Sn	Tin	tetrachloroethane, 1,1,1,2 -
Sr	Strontium	tetrachloroethane, 1,1,2,2 -
Tl	Thalium	tetrachloroethene
		toluene
		trichloroethane, 1,1,1 –
		trichloroethane, 1,1,2 -
		trichloroethene (trichloroethylene, 1,1,2 -)
		xylenes

FIDELE NTAMWEMEZI 2018/10/06
Fidele Ntamwemezi 10:30
8.5/8, 9/9.0

Maxxam
A Bureau Veritas Group Company

Site Location: ST. MARYS
Your C.O.C. #: 30742

Attention: Kirk Easto
RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2019/01/04
Report #: R5547069
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8X2103
Received: 2018/12/10, 10:21

Sample Matrix: Stack Sampling Train
Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Chlorobenzenes in MM5 Trains (EPA M0010)	6	2018/12/15	2018/12/29	BRL SOP-00202	In house (M0010)
Chlorobenzenes in MM5 Trains (EPA M0010)	1	2018/12/15	2018/12/30	BRL SOP-00202	In house (M0010)
Chlorophenols in MM5 Trains (EPA M0010)	5	2018/12/15	2019/01/01	BRL SOP-00204	In house (M0010)
Chlorophenols in MM5 Trains (EPA M0010)	2	2018/12/15	2019/01/02	BRL SOP-00204	In house (M0010)
Dioxins/Furans in Air (Method 23)	7	2018/12/11	2018/12/22	BRL SOP-00404	EPA M23/23A m
PAH's in MM5 SamplingTrains (CARB429mod)	7	2018/12/15	2018/12/22	BRL SOP-00201	CARB429(ARBM1,M2)mod
PCBs in a Sampling Train (1668Amod)	7	2018/12/15	2018/12/31	BRL SOP-00408	EPA 1668A m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Site Location: ST. MARYS
Your C.O.C. #: 30742

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2019/01/04
Report #: R5547069
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8X2103

Received: 2018/12/10, 10:21

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769

==

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B8X2103
Report Date: 2019/01/04

RWDI Air Inc
Site Location: ST. MARYS

RESULTS OF ANALYSES OF STACK SAMPLING TRAIN

Maxxam ID		INM727							
Sampling Date									
COC Number		30742				TOXIC EQUIVALENCY		# of	
	UNITS	**SVOC- BLANK**	**EDL**	**RDL**	**MDL**	**TEF (NATO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
33'44'-TetraCB-(77)	ng	ND	0.031	0.60	N/A	0.00050	0.000016		5891014
344'5-TetraCB-(81)	ng	ND	0.030	0.60	N/A	0.00010	0.0000030		5891014
233'44'-PentaCB-(105)	ng	ND	0.018	0.60	N/A	0.00050	0.0000090		5891014
2344'5-PentaCB-(114)	ng	ND	0.018	0.60	N/A	0.00010	0.0000018		5891014
23'44'5-PentaCB-(118)	ng	0.045	0.018	0.60	N/A	0.00010	0.0000045		5891014
23'44'5'-PentaCB-(123)	ng	ND	0.020	0.60	N/A	0.00010	0.0000020		5891014
33'44'5-PentaCB-(126)	ng	ND	0.017	0.60	N/A	0.10	0.0017		5891014
HexaCB-(156)+(157)	ng	ND	0.032	1.2	N/A	0.00050	0.000016		5891014
23'44'55'-HexaCB-(167)	ng	ND	0.030	0.60	N/A	0.000010	0.00000030		5891014
33'44'55'-HexaCB-(169)	ng	ND	0.032	0.60	N/A	0.010	0.00032		5891014
233'44'55'-HeptaCB-(189)	ng	ND	0.066	0.60	N/A	0.00010	0.0000066		5891014
TOTAL TOXIC EQUIVALENCY	ng						0.0021		
Surrogate Recovery (%)									
C13-233'44'55'-HeptaCB-(189)	%	121							5891014
C13-233'44'5-HexaCB-(156)	%	100							5891014
C13-233'44'5'-HexaCB-(157)	%	100							5891014
C13-233'44'-PentaCB-(105)	%	112							5891014
C13-23'44'55'-HexaCB-(167)	%	105							5891014
C13-2344'5-PentaCB-(114)	%	112							5891014
C13-23'44'5-PentaCB-(118)	%	114							5891014
C13-2'344'5-PentaCB-(123)	%	111							5891014
C13-33'44'55'-HexaCB-(169)	%	83							5891014
C13-33'44'5-PentaCB-(126)	%	107							5891014
C13-33'44'-TetraCB-(77)	%	107							5891014
C13-344'5-TetraCB-(81)	%	105							5891014

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

NATO(1989) North Atlantic Treaty Organization/Committee on the Challenges of Modern Society (NATO/CCMS) International Toxicity Equivalency Factors (I-TEF)
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

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Maxxam Job #: B8X2103
Report Date: 2019/01/04

RWDI Air Inc
Site Location: ST. MARYS

RESULTS OF ANALYSES OF STACK SAMPLING TRAIN

Maxxam ID		INM731							
Sampling Date		2018/12/04							
COC Number		30742				**TOXIC EQUIVALENCY**		# of	
	UNITS	**SVOC- ALTFUEL-T1**	**EDL**	**RDL**	**MDL**	**TEF (NATO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
33'44'-TetraCB-(77)	ng	0.10	0.058	0.60	N/A	0.00050	0.000050		5891014
344'5-TetraCB-(81)	ng	ND	0.057	0.60	N/A	0.00010	0.0000057		5891014
233'44'-PentaCB-(105)	ng	0.32	0.035	0.60	N/A	0.00050	0.00016		5891014
2344'5-PentaCB-(114)	ng	ND	0.035	0.60	N/A	0.00010	0.0000035		5891014
23'44'5-PentaCB-(118)	ng	1.0	0.035	0.60	N/A	0.00010	0.00010		5891014
23'44'5'-PentaCB-(123)	ng	ND	0.039	0.60	N/A	0.00010	0.0000039		5891014
33'44'5-PentaCB-(126)	ng	ND	0.033	0.60	N/A	0.10	0.0033		5891014
HexaCB-(156)+(157)	ng	0.11	0.050	1.2	N/A	0.00050	0.000055		5891014
23'44'55'-HexaCB-(167)	ng	ND	0.048	0.60	N/A	0.000010	0.00000048		5891014
33'44'55'-HexaCB-(169)	ng	ND	0.051	0.60	N/A	0.010	0.00051		5891014
233'44'55'-HeptaCB-(189)	ng	ND	0.065	0.60	N/A	0.00010	0.0000065		5891014
TOTAL TOXIC EQUIVALENCY	ng						0.0042		
Surrogate Recovery (%)									
C13-233'44'55'-HeptaCB-(189)	%	110							5891014
C13-233'44'5-HexaCB-(156)	%	86							5891014
C13-233'44'5'-HexaCB-(157)	%	86							5891014
C13-233'44'-PentaCB-(105)	%	90							5891014
C13-23'44'55'-HexaCB-(167)	%	92							5891014
C13-2344'5-PentaCB-(114)	%	92							5891014
C13-23'44'5-PentaCB-(118)	%	94							5891014
C13-2'344'5-PentaCB-(123)	%	93							5891014
C13-33'44'55'-HexaCB-(169)	%	64							5891014
C13-33'44'5-PentaCB-(126)	%	78							5891014
C13-33'44'-TetraCB-(77)	%	105							5891014
C13-344'5-TetraCB-(81)	%	107							5891014

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

NATO(1989) North Atlantic Treaty Organization/Committee on the Challenges of Modern Society (NATO/CCMS) International Toxicity Equivalency Factors (I-TEF)

QC Batch = Quality Control Batch

N/A = Not Applicable

ND = Not detected

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Maxxam Job #: B8X2103
Report Date: 2019/01/04

RWDI Air Inc
Site Location: ST. MARYS

RESULTS OF ANALYSES OF STACK SAMPLING TRAIN

Maxxam ID		INM732							
Sampling Date		2018/12/05							
COC Number		30742				**TOXIC EQUIVALENCY**		# of	
	UNITS	**SVOC- ALTFUEL-T2**	**EDL**	**RDL**	**MDL**	**TEF (NATO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
33'44'-TetraCB-(77)	ng	ND	0.066	0.60	N/A	0.00050	0.000033		5891014
344'5-TetraCB-(81)	ng	ND	0.064	0.60	N/A	0.00010	0.0000064		5891014
233'44'-PentaCB-(105)	ng	0.16	0.037	0.60	N/A	0.00050	0.000080		5891014
2344'5-PentaCB-(114)	ng	ND	0.037	0.60	N/A	0.00010	0.0000037		5891014
23'44'5-PentaCB-(118)	ng	0.43	0.036	0.60	N/A	0.00010	0.000043		5891014
23'44'5'-PentaCB-(123)	ng	ND	0.041	0.60	N/A	0.00010	0.0000041		5891014
33'44'5-PentaCB-(126)	ng	ND	0.035	0.60	N/A	0.10	0.0035		5891014
HexaCB-(156)+(157)	ng	ND	0.10	1.2	N/A	0.00050	0.000050		5891014
23'44'55'-HexaCB-(167)	ng	ND	0.099	0.60	N/A	0.000010	0.00000099		5891014
33'44'55'-HexaCB-(169)	ng	ND	0.11	0.60	N/A	0.010	0.0011		5891014
233'44'55'-HeptaCB-(189)	ng	ND	0.12	0.60	N/A	0.00010	0.000012		5891014
TOTAL TOXIC EQUIVALENCY	ng						0.0048		
Surrogate Recovery (%)									
C13-233'44'55'-HeptaCB-(189)	%	120							5891014
C13-233'44'5-HexaCB-(156)	%	84							5891014
C13-233'44'5'-HexaCB-(157)	%	84							5891014
C13-233'44'-PentaCB-(105)	%	87							5891014
C13-23'44'55'-HexaCB-(167)	%	90							5891014
C13-2344'5-PentaCB-(114)	%	90							5891014
C13-23'44'5-PentaCB-(118)	%	94							5891014
C13-2'344'5-PentaCB-(123)	%	92							5891014
C13-33'44'55'-HexaCB-(169)	%	58							5891014
C13-33'44'5-PentaCB-(126)	%	71							5891014
C13-33'44'-TetraCB-(77)	%	92							5891014
C13-344'5-TetraCB-(81)	%	95							5891014

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
NATO(1989) North Atlantic Treaty Organization/Committee on the Challenges of Modern Society (NATO/CCMS) International Toxicity Equivalency Factors (I-TEF)
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

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Maxxam Job #: B8X2103
Report Date: 2019/01/04

RWDI Air Inc
Site Location: ST. MARYS

RESULTS OF ANALYSES OF STACK SAMPLING TRAIN

Maxxam ID		INM733							
Sampling Date		2018/12/06							
COC Number		30742				**TOXIC EQUIVALENCY**		# of	
	UNITS	**SVOC- ALTFUEL-T3**	**EDL**	**RDL**	**MDL**	**TEF (NATO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
33'44'-TetraCB-(77)	ng	ND	0.049	0.60	N/A	0.00050	0.000025		5891014
344'5-TetraCB-(81)	ng	ND	0.048	0.60	N/A	0.00010	0.0000048		5891014
233'44'-PentaCB-(105)	ng	0.058	0.023	0.60	N/A	0.00050	0.000029		5891014
2344'5-PentaCB-(114)	ng	ND	0.023	0.60	N/A	0.00010	0.0000023		5891014
23'44'5-PentaCB-(118)	ng	0.17	0.022	0.60	N/A	0.00010	0.000017		5891014
23'44'5'-PentaCB-(123)	ng	ND	0.025	0.60	N/A	0.00010	0.0000025		5891014
33'44'5-PentaCB-(126)	ng	ND	0.022	0.60	N/A	0.10	0.0022		5891014
HexaCB-(156)+(157)	ng	ND	0.059	1.2	N/A	0.00050	0.000030		5891014
23'44'55'-HexaCB-(167)	ng	ND	0.057	0.60	N/A	0.000010	0.00000057		5891014
33'44'55'-HexaCB-(169)	ng	ND	0.061	0.60	N/A	0.010	0.00061		5891014
233'44'55'-HeptaCB-(189)	ng	ND	0.053	0.60	N/A	0.00010	0.0000053		5891014
TOTAL TOXIC EQUIVALENCY	ng						0.0029		
Surrogate Recovery (%)									
C13-233'44'55'-HeptaCB-(189)	%	98							5891014
C13-233'44'5-HexaCB-(156)	%	70							5891014
C13-233'44'5'-HexaCB-(157)	%	70							5891014
C13-233'44'-PentaCB-(105)	%	78							5891014
C13-23'44'55'-HexaCB-(167)	%	73							5891014
C13-2344'5-PentaCB-(114)	%	80							5891014
C13-23'44'5-PentaCB-(118)	%	82							5891014
C13-2'344'5-PentaCB-(123)	%	83							5891014
C13-33'44'55'-HexaCB-(169)	%	49							5891014
C13-33'44'5-PentaCB-(126)	%	66							5891014
C13-33'44'-TetraCB-(77)	%	83							5891014
C13-344'5-TetraCB-(81)	%	85							5891014

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
NATO(1989) North Atlantic Treaty Organization/Committee on the Challenges of Modern Society (NATO/CCMS) International Toxicity Equivalency Factors (I-TEF)
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Maxxam Job #: B8X2103
Report Date: 2019/01/04

RWDI Air Inc
Site Location: ST. MARYS

RESULTS OF ANALYSES OF STACK SAMPLING TRAIN

Maxxam ID		INM855							
Sampling Date		2018/12/07							
COC Number		30742				**TOXIC EQUIVALENCY**		# of	
	UNITS	**SVOC- BASELINE-T1**	**EDL**	**RDL**	**MDL**	**TEF (NATO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
33'44'-TetraCB-(77)	ng	ND	0.085	0.60	N/A	0.00050	0.000043		5891014
344'5-TetraCB-(81)	ng	ND	0.083	0.60	N/A	0.00010	0.0000083		5891014
233'44'-PentaCB-(105)	ng	0.079	0.042	0.60	N/A	0.00050	0.000040		5891014
2344'5-PentaCB-(114)	ng	ND	0.041	0.60	N/A	0.00010	0.0000041		5891014
23'44'5-PentaCB-(118)	ng	0.25	0.041	0.60	N/A	0.00010	0.000025		5891014
23'44'5'-PentaCB-(123)	ng	ND	0.046	0.60	N/A	0.00010	0.0000046		5891014
33'44'5-PentaCB-(126)	ng	ND	0.039	0.60	N/A	0.10	0.0039		5891014
HexaCB-(156)+(157)	ng	ND	0.082	1.2	N/A	0.00050	0.000041		5891014
23'44'55'-HexaCB-(167)	ng	ND	0.079	0.60	N/A	0.000010	0.00000079		5891014
33'44'55'-HexaCB-(169)	ng	ND	0.084	0.60	N/A	0.010	0.00084		5891014
233'44'55'-HeptaCB-(189)	ng	ND	0.060	0.60	N/A	0.00010	0.0000060		5891014
TOTAL TOXIC EQUIVALENCY	ng						0.0049		
Surrogate Recovery (%)									
C13-233'44'55'-HeptaCB-(189)	%	91							5891014
C13-233'44'5-HexaCB-(156)	%	75							5891014
C13-233'44'5'-HexaCB-(157)	%	75							5891014
C13-233'44'-PentaCB-(105)	%	78							5891014
C13-23'44'55'-HexaCB-(167)	%	79							5891014
C13-2344'5-PentaCB-(114)	%	83							5891014
C13-23'44'5-PentaCB-(118)	%	85							5891014
C13-2'344'5-PentaCB-(123)	%	83							5891014
C13-33'44'55'-HexaCB-(169)	%	57							5891014
C13-33'44'5-PentaCB-(126)	%	71							5891014
C13-33'44'-TetraCB-(77)	%	84							5891014
C13-344'5-TetraCB-(81)	%	86							5891014

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
NATO(1989) North Atlantic Treaty Organization/Committee on the Challenges of Modern Society (NATO/CCMS) International Toxicity Equivalency Factors (I-TEF)
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

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Maxxam Job #: B8X2103
Report Date: 2019/01/04

RWDI Air Inc
Site Location: ST. MARYS

RESULTS OF ANALYSES OF STACK SAMPLING TRAIN

Maxxam ID		INM856							
Sampling Date		2018/12/07							
COC Number		30742				**TOXIC EQUIVALENCY**		# of	
	UNITS	**SVOC- BASELINE-T2**	**EDL**	**RDL**	**MDL**	**TEF (NATO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
33'44'-TetraCB-(77)	ng	ND	0.039	0.60	N/A	0.00050	0.000020		5891014
344'5-TetraCB-(81)	ng	ND	0.038	0.60	N/A	0.00010	0.0000038		5891014
233'44'-PentaCB-(105)	ng	0.072	0.024	0.60	N/A	0.00050	0.000036		5891014
2344'5-PentaCB-(114)	ng	ND	0.024	0.60	N/A	0.00010	0.0000024		5891014
23'44'5-PentaCB-(118)	ng	ND (1)	0.18	0.60	N/A	0.00010	0.000018		5891014
23'44'5'-PentaCB-(123)	ng	ND	0.026	0.60	N/A	0.00010	0.0000026		5891014
33'44'5-PentaCB-(126)	ng	ND	0.023	0.60	N/A	0.10	0.0023		5891014
HexaCB-(156)+(157)	ng	ND	0.092	1.2	N/A	0.00050	0.000046		5891014
23'44'55'-HexaCB-(167)	ng	ND	0.088	0.60	N/A	0.000010	0.00000088		5891014
33'44'55'-HexaCB-(169)	ng	ND	0.094	0.60	N/A	0.010	0.00094		5891014
233'44'55'-HeptaCB-(189)	ng	ND	0.068	0.60	N/A	0.00010	0.0000068		5891014
TOTAL TOXIC EQUIVALENCY	ng						0.0034		
Surrogate Recovery (%)									
C13-233'44'55'-HeptaCB-(189)	%	102							5891014
C13-233'44'5-HexaCB-(156)	%	74							5891014
C13-233'44'5'-HexaCB-(157)	%	74							5891014
C13-233'44'-PentaCB-(105)	%	81							5891014
C13-23'44'55'-HexaCB-(167)	%	80							5891014
C13-2344'5-PentaCB-(114)	%	85							5891014
C13-23'44'5-PentaCB-(118)	%	84							5891014
C13-2'344'5-PentaCB-(123)	%	88							5891014
C13-33'44'55'-HexaCB-(169)	%	51							5891014
C13-33'44'5-PentaCB-(126)	%	68							5891014
C13-33'44'-TetraCB-(77)	%	89							5891014
C13-344'5-TetraCB-(81)	%	89							5891014

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
NATO(1989) North Atlantic Treaty Organization/Committee on the Challenges of Modern Society (NATO/CCMS) International Toxicity Equivalency Factors (I-TEF)
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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Maxxam Job #: B8X2103
Report Date: 2019/01/04

RWDI Air Inc
Site Location: ST. MARYS

RESULTS OF ANALYSES OF STACK SAMPLING TRAIN

Maxxam ID		INM857							
Sampling Date		2018/12/08							
COC Number		30742				**TOXIC EQUIVALENCY**		# of	
	UNITS	**SVOC- BASELINE-T3**	**EDL**	**RDL**	**MDL**	**TEF (NATO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
33'44'-TetraCB-(77)	ng	ND	0.082	0.60	N/A	0.00050	0.000041		5891014
344'5-TetraCB-(81)	ng	ND	0.081	0.60	N/A	0.00010	0.0000081		5891014
233'44'-PentaCB-(105)	ng	0.11	0.042	0.60	N/A	0.00050	0.000055		5891014
2344'5-PentaCB-(114)	ng	ND	0.041	0.60	N/A	0.00010	0.0000041		5891014
23'44'5-PentaCB-(118)	ng	0.31	0.041	0.60	N/A	0.00010	0.000031		5891014
23'44'5'-PentaCB-(123)	ng	ND	0.046	0.60	N/A	0.00010	0.0000046		5891014
33'44'5-PentaCB-(126)	ng	ND	0.039	0.60	N/A	0.10	0.0039		5891014
HexaCB-(156)+(157)	ng	ND (1)	0.066	1.2	N/A	0.00050	0.000033		5891014
23'44'55'-HexaCB-(167)	ng	ND	0.057	0.60	N/A	0.000010	0.00000057		5891014
33'44'55'-HexaCB-(169)	ng	ND	0.061	0.60	N/A	0.010	0.00061		5891014
233'44'55'-HeptaCB-(189)	ng	ND	0.11	0.60	N/A	0.00010	0.000011		5891014
TOTAL TOXIC EQUIVALENCY	ng						0.0047		
Surrogate Recovery (%)									
C13-233'44'55'-HeptaCB-(189)	%	106							5891014
C13-233'44'5-HexaCB-(156)	%	75							5891014
C13-233'44'5'-HexaCB-(157)	%	75							5891014
C13-233'44'-PentaCB-(105)	%	82							5891014
C13-23'44'55'-HexaCB-(167)	%	82							5891014
C13-2344'5-PentaCB-(114)	%	87							5891014
C13-23'44'5-PentaCB-(118)	%	88							5891014
C13-2'344'5-PentaCB-(123)	%	88							5891014
C13-33'44'55'-HexaCB-(169)	%	48							5891014
C13-33'44'5-PentaCB-(126)	%	68							5891014
C13-33'44'-TetraCB-(77)	%	90							5891014
C13-344'5-TetraCB-(81)	%	92							5891014

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
NATO(1989) North Atlantic Treaty Organization/Committee on the Challenges of Modern Society (NATO/CCMS) International Toxicity Equivalency Factors (I-TEF)
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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Maxxam Job #: B8X2103
Report Date: 2019/01/04

RWDI Air Inc
Site Location: ST. MARYS

SEMI-VOLATILE ORGANICS BY GC-MS (STACK SAMPLING TRAIN)

Maxxam ID		INM727			INM731	INM732			
Sampling Date					2018/12/04	2018/12/05			
COC Number		30742			30742	30742			
	UNITS	**SVOC- BLANK**	**RDL**	**MDL**	**SVOC- ALTFUEL-T1**	**SVOC- ALTFUEL-T2**	**RDL**	**MDL**	**QC Batch**
1-Methylnaphthalene	ug	ND	0.30	0.30	318	287	3.0	3.0	5891011
1-Methylphenanthrene	ug	ND	0.30	0.30	1.62	0.84	0.30	0.30	5891011
2-Chloronaphthalene	ug	ND	0.30	0.30	4.44	4.08	0.30	0.30	5891011
2-Methylanthracene	ug	ND	0.30	0.30	ND	ND	0.30	0.30	5891011
2-Methylnaphthalene	ug	ND	0.30	0.060	477	427	3.0	0.60	5891011
3-Methylcholanthrene	ug	ND	0.30	0.30	ND	ND	0.30	0.30	5891011
7,12-Dimethylbenzo(a)anthracene	ug	ND	1.2	0.30	ND	ND	1.2	0.30	5891011
9,10-Dimethylanthracene	ug	ND	0.30	0.30	ND	ND	0.30	0.30	5891011
9-Methylphenanthrene	ug	ND	0.30	N/A	4.20	1.86	0.30	N/A	5891011
Acenaphthene	ug	ND	0.30	0.060	4.92	4.74	0.30	0.060	5891011
Acenaphthylene	ug	ND	0.30	0.060	6.96	5.70	0.30	0.060	5891011
Anthracene	ug	ND	0.30	0.060	0.48	0.30	0.30	0.060	5891011
Benzo(a)anthracene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891011
Benzo(a)fluorene	ug	ND	0.30	0.30	ND	ND	0.30	0.30	5891011
Benzo(a)pyrene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891011
Benzo(b)fluoranthene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891011
Benzo(b)fluorene	ug	ND	0.30	0.30	ND	ND	0.30	0.30	5891011
Benzo(e)pyrene	ug	ND	0.30	0.30	ND	ND	0.30	0.30	5891011
Benzo(g,h,i)perylene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891011
Benzo(k)fluoranthene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891011
Chrysene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891011
Coronene	ug	ND	0.30	0.30	ND	ND	0.30	0.30	5891011
Dibenzo(a,c)anthracene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891011
Fluoranthene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891011
Fluorene	ug	ND	0.30	0.060	3.42	2.28	0.30	0.060	5891011
Indeno(1,2,3-cd)pyrene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891011
Naphthalene	ug	ND	0.30	0.30	590	658	3.0	3.0	5891011
Perylene	ug	ND	0.30	0.30	ND	ND	0.30	0.30	5891011
Phenanthrene	ug	ND	0.30	0.060	16.1	8.64	0.30	0.060	5891011
Picene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891011
Pyrene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891011
Tetralin	ug	ND	0.30	0.30	187	177	3.0	3.0	5891011
Triphenylene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891011
1,2,3,4-Tetrachlorobenzene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891012

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
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Maxxam Job #: B8X2103
Report Date: 2019/01/04

RWDI Air Inc
Site Location: ST. MARYS

SEMI-VOLATILE ORGANICS BY GC-MS (STACK SAMPLING TRAIN)

Maxxam ID		INM727			INM731	INM732			
Sampling Date					2018/12/04	2018/12/05			
COC Number		30742			30742	30742			
	UNITS	**SVOC- BLANK**	**RDL**	**MDL**	**SVOC- ALTFUEL-T1**	**SVOC- ALTFUEL-T2**	**RDL**	**MDL**	**QC Batch**
1,2,3,5+1,2,4,5-Tetrachlorobenzene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891012
1,2,3-Trichlorobenzene	ug	ND	0.30	0.060	1.13	0.83	0.30	0.060	5891012
1,2,4-Trichlorobenzene	ug	ND	0.30	0.060	1.91	1.45	0.30	0.060	5891012
1,2-Dichlorobenzene	ug	ND	0.30	0.060	5.32	4.30	0.30	0.060	5891012
1,3,5-Trichlorobenzene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891012
1,3-Dichlorobenzene	ug	ND	0.30	0.060	2.40	1.88	0.30	0.060	5891012
1,4-Dichlorobenzene	ug	ND	0.30	0.060	3.49	2.13	0.30	0.060	5891012
Hexachlorobenzene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891012
Pentachlorobenzene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891012
2,3,4,5-Tetrachlorophenol	ug	ND	0.30	0.24	ND	ND	0.30	0.24	5891013
2,3,4,6-Tetrachlorophenol	ug	ND	0.30	0.24	ND	ND	0.30	0.24	5891013
2,3,4-Trichlorophenol	ug	ND	0.30	0.24	ND	ND	0.30	0.24	5891013
2,3,5,6-Tetrachlorophenol	ug	ND	0.30	0.24	ND	ND	0.30	0.24	5891013
2,3,5-Trichlorophenol	ug	ND	0.30	0.24	ND	ND	0.30	0.24	5891013
2,3,6-Trichlorophenol	ug	ND	0.30	0.24	ND	ND	0.30	0.24	5891013
2,3-Dichlorophenol	ug	ND	0.30	0.24	ND	ND	0.30	0.24	5891013
2,4 + 2,5-Dichlorophenol	ug	ND	0.30	0.24	0.57	0.43	0.30	0.24	5891013
2,4,5-Trichlorophenol	ug	ND	0.30	0.24	ND	ND	0.30	0.24	5891013
2,4,6-Trichlorophenol	ug	ND	0.30	0.24	ND	ND	0.30	0.24	5891013
2,6-Dichlorophenol	ug	ND	0.30	0.24	ND	ND	0.30	0.24	5891013
2-Chlorophenol	ug	ND	0.30	0.24	22.9	15.9	0.30	0.24	5891013
3,4,5-Trichlorophenol	ug	ND	0.30	0.24	ND	ND	0.30	0.24	5891013
3,4-Dichlorophenol	ug	ND	0.30	0.24	ND	ND	0.30	0.24	5891013
3,5-Dichlorophenol	ug	ND	0.30	0.24	0.41	0.31	0.30	0.24	5891013
3-Chlorophenol	ug	ND	0.30	0.24	2.90	1.98	0.30	0.24	5891013
4-Chlorophenol	ug	ND	0.30	0.24	2.60	1.42	0.30	0.24	5891013
Pentachlorophenol	ug	ND	0.30	0.24	ND	ND	0.30	0.24	5891013
Surrogate Recovery (%)									
13C6-Hexachlorobenzene	%	94			82	73			5891012
2H3-1,2,4-Trichlorobenzene	%	86			94	69			5891012
2H4-1,3-Dichlorobenzene	%	71			112	80			5891012
D3-2,4-Dichlorophenol	%	95			82	95			5891013
D6-Pentachlorophenol	%	91			89	90			5891013
D10-2-Methylnaphthalene	%	102			116	144			5891011

RDL = Reportable Detection Limit
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ND = Not detected

Maxxam Job #: B8X2103
Report Date: 2019/01/04

RWDI Air Inc
Site Location: ST. MARYS

SEMI-VOLATILE ORGANICS BY GC-MS (STACK SAMPLING TRAIN)

Maxxam ID		INM727			INM731	INM732			
Sampling Date					2018/12/04	2018/12/05			
COC Number		30742			30742	30742			
	UNITS	**SVOC- BLANK**	**RDL**	**MDL**	**SVOC- ALTFUEL-T1**	**SVOC- ALTFUEL-T2**	**RDL**	**MDL**	**QC Batch**
D10-Anthracene	%	106			80	30 (1)			5891011
D10-Fluoranthene	%	108			82	84			5891011
D10-Fluorene (FS)	%	52			40 (2)	40 (1)			5891011
D10-Phenanthrene	%	104			76	78			5891011
D12-Benzo(a)anthracene	%	102			104	98			5891011
D12-Benzo(a)pyrene	%	74			100	96			5891011
D12-Benzo(b)fluoranthene	%	96			98	92			5891011
D12-Benzo(ghi)perylene	%	98			98	92			5891011
D12-Benzo(k)fluoranthene	%	106			100	96			5891011
D12-Chrysene	%	96			96	92			5891011
D12-Indeno(1,2,3-cd)pyrene	%	100			98	94			5891011
D12-Perylene	%	80			94	90			5891011
D14-Dibenzo(a,h)anthracene	%	100			98	94			5891011
D14-Terphenyl (FS)	%	52			60 (3)	42 (1)			5891011
D8-Acenaphthylene	%	102			94	94			5891011
D8-Naphthalene	%	98			110	110			5891011

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) Low d10-fluorene field spike recovery. Suspect sample matrix as cause due to acceptable recovery of d14-terphenyl field spike.

(3) D14-Terphenyl recovery was reported from 10X Dilution due to matrix effects.

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SEMI-VOLATILE ORGANICS BY GC-MS (STACK SAMPLING TRAIN)

Maxxam ID		INM733			INM855	INM856			
Sampling Date		2018/12/06			2018/12/07	2018/12/07			
COC Number		30742			30742	30742			
	UNITS	**SVOC- ALTFUEL-T3**	**RDL**	**MDL**	**SVOC- BASELINE-T1**	**SVOC- BASELINE-T2**	**RDL**	**MDL**	**QC Batch**
1-Methylnaphthalene	ug	306	3.0	3.0	340	278	3.0	3.0	5891011
1-Methylphenanthrene	ug	0.48	0.30	0.30	0.84	0.66	0.30	0.30	5891011
2-Chloronaphthalene	ug	3.90	0.30	0.30	4.98	5.04	0.30	0.30	5891011
2-Methylanthracene	ug	ND	0.30	0.30	ND	ND	0.30	0.30	5891011
2-Methylnaphthalene	ug	443	3.0	0.60	545	425	3.0	0.60	5891011
3-Methylcholanthrene	ug	ND	0.30	0.30	ND	ND	0.30	0.30	5891011
7,12-Dimethylbenzo(a)anthracene	ug	ND	1.2	0.30	ND	ND	1.2	0.30	5891011
9,10-Dimethylanthracene	ug	ND	0.30	0.30	ND	ND	0.30	0.30	5891011
9-Methylphenanthrene	ug	1.08	0.30	N/A	1.86	1.38	0.30	N/A	5891011
Acenaphthene	ug	4.56	0.30	0.060	5.46	5.04	0.30	0.060	5891011
Acenaphthylene	ug	6.42	0.30	0.060	19.6	6.00	0.30	0.060	5891011
Anthracene	ug	ND	0.30	0.060	0.54	ND	0.30	0.060	5891011
Benzo(a)anthracene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891011
Benzo(a)fluorene	ug	ND	0.30	0.30	ND	ND	0.30	0.30	5891011
Benzo(a)pyrene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891011
Benzo(b)fluoranthene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891011
Benzo(b)fluorene	ug	ND	0.30	0.30	ND	ND	0.30	0.30	5891011
Benzo(e)pyrene	ug	ND	0.30	0.30	ND	ND	0.30	0.30	5891011
Benzo(g,h,i)perylene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891011
Benzo(k)fluoranthene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891011
Chrysene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891011
Coronene	ug	ND	0.30	0.30	ND	ND	0.30	0.30	5891011
Dibenzo(a,c)anthracene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891011
Fluoranthene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891011
Fluorene	ug	2.10	0.30	0.060	3.36	2.64	0.30	0.060	5891011
Indeno(1,2,3-cd)pyrene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891011
Naphthalene	ug	802	3.0	3.0	930	538	3.0	3.0	5891011
Perylene	ug	ND	0.30	0.30	ND	ND	0.30	0.30	5891011
Phenanthrene	ug	6.66	0.30	0.060	12.8	7.80	0.30	0.060	5891011
Picene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891011
Pyrene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891011
Tetralin	ug	192	3.0	3.0	188	157	3.0	3.0	5891011
Triphenylene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891011
1,2,3,4-Tetrachlorobenzene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891012

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

SEMI-VOLATILE ORGANICS BY GC-MS (STACK SAMPLING TRAIN)

Maxxam ID		INM733			INM855	INM856			
Sampling Date		2018/12/06			2018/12/07	2018/12/07			
COC Number		30742			30742	30742			
	UNITS	**SVOC- ALTFUEL-T3**	**RDL**	**MDL**	**SVOC- BASELINE-T1**	**SVOC- BASELINE-T2**	**RDL**	**MDL**	**QC Batch**
1,2,3,5+1,2,4,5-Tetrachlorobenzene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891012
1,2,3-Trichlorobenzene	ug	2.17	0.30	0.060	1.55	1.99	0.30	0.060	5891012
1,2,4-Trichlorobenzene	ug	1.37	0.30	0.060	2.66	2.60	0.30	0.060	5891012
1,2-Dichlorobenzene	ug	5.31	0.30	0.060	7.22	7.43	0.30	0.060	5891012
1,3,5-Trichlorobenzene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891012
1,3-Dichlorobenzene	ug	2.80	0.30	0.060	3.42	3.75	0.30	0.060	5891012
1,4-Dichlorobenzene	ug	2.66	0.30	0.060	3.88	3.31	0.30	0.060	5891012
Hexachlorobenzene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891012
Pentachlorobenzene	ug	ND	0.30	0.060	ND	ND	0.30	0.060	5891012
2,3,4,5-Tetrachlorophenol	ug	ND	0.30	0.24	ND	ND	1.2	0.96	5891013
2,3,4,6-Tetrachlorophenol	ug	ND	0.30	0.24	ND	ND	1.2	0.96	5891013
2,3,4-Trichlorophenol	ug	ND	0.30	0.24	ND	ND	1.2	0.96	5891013
2,3,5,6-Tetrachlorophenol	ug	ND	0.30	0.24	ND	ND	1.2	0.96	5891013
2,3,5-Trichlorophenol	ug	ND	0.30	0.24	ND	ND	1.2	0.96	5891013
2,3,6-Trichlorophenol	ug	ND	0.30	0.24	ND	ND	1.2	0.96	5891013
2,3-Dichlorophenol	ug	ND	0.30	0.24	ND	ND	1.2	0.96	5891013
2,4 + 2,5-Dichlorophenol	ug	0.45	0.30	0.24	ND	ND	1.2	0.96	5891013
2,4,5-Trichlorophenol	ug	ND	0.30	0.24	ND	ND	1.2	0.96	5891013
2,4,6-Trichlorophenol	ug	ND	0.30	0.24	ND	ND	1.2	0.96	5891013
2,6-Dichlorophenol	ug	ND	0.30	0.24	ND	ND	1.2	0.96	5891013
2-Chlorophenol	ug	20.6	0.30	0.24	18.7	19.4	1.2	0.96	5891013
3,4,5-Trichlorophenol	ug	ND	0.30	0.24	ND	ND	1.2	0.96	5891013
3,4-Dichlorophenol	ug	ND	0.30	0.24	ND	ND	1.2	0.96	5891013
3,5-Dichlorophenol	ug	ND	0.30	0.24	ND	ND	1.2	0.96	5891013
3-Chlorophenol	ug	1.98	0.30	0.24	3.0	2.8	1.2	0.96	5891013
4-Chlorophenol	ug	1.43	0.30	0.24	2.3	2.4	1.2	0.96	5891013
Pentachlorophenol	ug	ND	0.30	0.24	ND	ND	1.2	0.96	5891013
Surrogate Recovery (%)									
13C6-Hexachlorobenzene	%	74			84	80			5891012
2H3-1,2,4-Trichlorobenzene	%	67			107	96			5891012
2H4-1,3-Dichlorobenzene	%	107			116	114			5891012
D3-2,4-Dichlorophenol	%	88			112	107			5891013
D6-Pentachlorophenol	%	96			116	114			5891013
D10-2-Methylnaphthalene	%	136			142	142			5891011
D10-Anthracene	%	82			74	74			5891011

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Maxxam Job #: B8X2103
Report Date: 2019/01/04

RWDI Air Inc
Site Location: ST. MARYS

SEMI-VOLATILE ORGANICS BY GC-MS (STACK SAMPLING TRAIN)

Maxxam ID		INM733			INM855	INM856			
Sampling Date		2018/12/06			2018/12/07	2018/12/07			
COC Number		30742			30742	30742			
	UNITS	**SVOC- ALTFUEL-T3**	**RDL**	**MDL**	**SVOC- BASELINE-T1**	**SVOC- BASELINE-T2**	**RDL**	**MDL**	**QC Batch**
D10-Fluoranthene	%	82			80	78			5891011
D10-Fluorene (FS)	%	40 (1)			40 (1)	40 (1)			5891011
D10-Phenanthrene	%	78			76	74			5891011
D12-Benzo(a)anthracene	%	100			100	100			5891011
D12-Benzo(a)pyrene	%	96			96	96			5891011
D12-Benzo(b)fluoranthene	%	94			96	94			5891011
D12-Benzo(ghi)perylene	%	94			94	94			5891011
D12-Benzo(k)fluoranthene	%	94			94	96			5891011
D12-Chrysene	%	92			92	92			5891011
D12-Indeno(1,2,3-cd)pyrene	%	94			96	94			5891011
D12-Perylene	%	90			92	90			5891011
D14-Dibenzo(a,h)anthracene	%	94			94	94			5891011
D14-Terphenyl (FS)	%	40 (1)			40 (1)	38 (1)			5891011
D8-Acenaphthylene	%	92			90	88			5891011
D8-Naphthalene	%	112			106	84			5891011

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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SEMI-VOLATILE ORGANICS BY GC-MS (STACK SAMPLING TRAIN)

Maxxam ID		INM857			
Sampling Date		2018/12/08			
COC Number		30742			
	UNITS	SVOC- BASELINE-T3	RDL	MDL	QC Batch
1-Methylnaphthalene	ug	269	3.0	3.0	5891011
1-Methylphenanthrene	ug	0.84	0.30	0.30	5891011
2-Chloronaphthalene	ug	5.10	0.30	0.30	5891011
2-Methylanthracene	ug	ND	0.30	0.30	5891011
2-Methylnaphthalene	ug	414	3.0	0.60	5891011
3-Methylcholanthrene	ug	ND	0.30	0.30	5891011
7,12-Dimethylbenzo(a)anthracene	ug	ND	1.2	0.30	5891011
9,10-Dimethylanthracene	ug	ND	0.30	0.30	5891011
9-Methylphenanthrene	ug	1.92	0.30	N/A	5891011
Acenaphthene	ug	4.68	0.30	0.060	5891011
Acenaphthylene	ug	5.88	0.30	0.060	5891011
Anthracene	ug	0.30	0.30	0.060	5891011
Benzo(a)anthracene	ug	ND	0.30	0.060	5891011
Benzo(a)fluorene	ug	ND	0.30	0.30	5891011
Benzo(a)pyrene	ug	ND	0.30	0.060	5891011
Benzo(b)fluoranthene	ug	ND	0.30	0.060	5891011
Benzo(b)fluorene	ug	ND	0.30	0.30	5891011
Benzo(e)pyrene	ug	ND	0.30	0.30	5891011
Benzo(g,h,i)perylene	ug	ND	0.30	0.060	5891011
Benzo(k)fluoranthene	ug	ND	0.30	0.060	5891011
Chrysene	ug	ND	0.30	0.060	5891011
Coronene	ug	ND	0.30	0.30	5891011
Dibenzo(a,c)anthracene	ug	ND	0.30	0.060	5891011
Fluoranthene	ug	ND	0.30	0.060	5891011
Fluorene	ug	2.46	0.30	0.060	5891011
Indeno(1,2,3-cd)pyrene	ug	ND	0.30	0.060	5891011
Naphthalene	ug	498	3.0	3.0	5891011
Perylene	ug	ND	0.30	0.30	5891011
Phenanthrene	ug	10.3	0.30	0.060	5891011
Picene	ug	ND	0.30	0.060	5891011
Pyrene	ug	ND	0.30	0.060	5891011
Tetralin	ug	149	3.0	3.0	5891011
Triphenylene	ug	ND	0.30	0.060	5891011
1,2,3,4-Tetrachlorobenzene	ug	ND	0.30	0.060	5891012

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Maxxam Job #: B8X2103
Report Date: 2019/01/04

RWDI Air Inc
Site Location: ST. MARYS

SEMI-VOLATILE ORGANICS BY GC-MS (STACK SAMPLING TRAIN)

Maxxam ID		INM857			
Sampling Date		2018/12/08			
COC Number		30742			
	UNITS	**SVOC- BASELINE-T3**	**RDL**	**MDL**	**QC Batch**
1,2,3,5+1,2,4,5-Tetrachlorobenzene	ug	ND	0.30	0.060	5891012
1,2,3-Trichlorobenzene	ug	4.51	0.30	0.060	5891012
1,2,4-Trichlorobenzene	ug	2.30	0.30	0.060	5891012
1,2-Dichlorobenzene	ug	6.08	0.30	0.060	5891012
1,3,5-Trichlorobenzene	ug	ND	0.30	0.060	5891012
1,3-Dichlorobenzene	ug	3.37	0.30	0.060	5891012
1,4-Dichlorobenzene	ug	3.95	0.30	0.060	5891012
Hexachlorobenzene	ug	ND	0.30	0.060	5891012
Pentachlorobenzene	ug	ND	0.30	0.060	5891012
2,3,4,5-Tetrachlorophenol	ug	ND	0.30	0.24	5891013
2,3,4,6-Tetrachlorophenol	ug	ND	0.30	0.24	5891013
2,3,4-Trichlorophenol	ug	ND	0.30	0.24	5891013
2,3,5,6-Tetrachlorophenol	ug	ND	0.30	0.24	5891013
2,3,5-Trichlorophenol	ug	ND	0.30	0.24	5891013
2,3,6-Trichlorophenol	ug	ND	0.30	0.24	5891013
2,3-Dichlorophenol	ug	ND	0.30	0.24	5891013
2,4 + 2,5-Dichlorophenol	ug	0.70	0.30	0.24	5891013
2,4,5-Trichlorophenol	ug	ND	0.30	0.24	5891013
2,4,6-Trichlorophenol	ug	ND	0.30	0.24	5891013
2,6-Dichlorophenol	ug	ND	0.30	0.24	5891013
2-Chlorophenol	ug	16.9	0.30	0.24	5891013
3,4,5-Trichlorophenol	ug	ND	0.30	0.24	5891013
3,4-Dichlorophenol	ug	ND	0.30	0.24	5891013
3,5-Dichlorophenol	ug	ND	0.30	0.24	5891013
3-Chlorophenol	ug	3.01	0.30	0.24	5891013
4-Chlorophenol	ug	2.56	0.30	0.24	5891013
Pentachlorophenol	ug	ND	0.30	0.24	5891013
Surrogate Recovery (%)					
13C6-Hexachlorobenzene	%	88			5891012
2H3-1,2,4-Trichlorobenzene	%	91			5891012
2H4-1,3-Dichlorobenzene	%	110			5891012
D3-2,4-Dichlorophenol	%	100			5891013
D6-Pentachlorophenol	%	102			5891013
D10-2-Methylnaphthalene	%	148			5891011
D10-Anthracene	%	82			5891011

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Report Date: 2019/01/04

RWDI Air Inc
Site Location: ST. MARYS

SEMI-VOLATILE ORGANICS BY GC-MS (STACK SAMPLING TRAIN)

Maxxam ID		INM857			
Sampling Date		2018/12/08			
COC Number		30742			
	UNITS	**SVOC- BASELINE-T3**	**RDL**	**MDL**	**QC Batch**
D10-Fluoranthene	%	84			5891011
D10-Fluorene (FS)	%	40 (1)			5891011
D10-Phenanthrene	%	78			5891011
D12-Benzo(a)anthracene	%	104			5891011
D12-Benzo(a)pyrene	%	100			5891011
D12-Benzo(b)fluoranthene	%	100			5891011
D12-Benzo(ghi)perylene	%	98			5891011
D12-Benzo(k)fluoranthene	%	98			5891011
D12-Chrysene	%	96			5891011
D12-Indeno(1,2,3-cd)pyrene	%	98			5891011
D12-Perylene	%	94			5891011
D14-Dibenzo(a,h)anthracene	%	98			5891011
D14-Terphenyl (FS)	%	80 (2)			5891011
D8-Acenaphthylene	%	90			5891011
D8-Naphthalene	%	88			5891011

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Low d10-fluorene field spike recovery. Suspect sample matrix as cause due to acceptable recovery of d14-terphenyl field spike.
(2) D14-Terphenyl recovery was reported from 10X Dilution due to matrix effects.

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RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (STACK SAMPLING TRAIN)

Maxxam ID		INM727							
Sampling Date									
COC Number		30742				TOXIC EQUIVALENCY		# of	
	UNITS	SVOC- BLANK	EDL	RDL	MDL	TEF (NATO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	ND	6.3	60	12	1.00	6.30		5902066
1,2,3,7,8-Penta CDD *	pg	ND	6.8	60	12	0.500	3.40		5902066
1,2,3,4,7,8-Hexa CDD *	pg	ND	6.7	60	12	0.100	0.670		5902066
1,2,3,6,7,8-Hexa CDD *	pg	ND	6.8	60	12	0.100	0.680		5902066
1,2,3,7,8,9-Hexa CDD *	pg	ND	6.2	60	12	0.100	0.620		5902066
1,2,3,4,6,7,8-Hepta CDD *	pg	ND	6.4	60	18	0.0100	0.0640		5902066
1,2,3,4,6,7,8,9-Octa CDD *	pg	8.6	6.0	600	18	0.00100	0.00860		5902066
Total Tetra CDD *	pg	ND (1)	13	60	N/A			0	5902066
Total Penta CDD *	pg	ND (1)	12	60	N/A			0	5902066
Total Hexa CDD *	pg	ND (1)	26	60	N/A			0	5902066
Total Hepta CDD *	pg	ND	6.4	60	N/A			0	5902066
2,3,7,8-Tetra CDF **	pg	ND	6.4	60	12	0.100	0.640		5902066
1,2,3,7,8-Penta CDF **	pg	ND	7.1	60	12	0.0500	0.355		5902066
2,3,4,7,8-Penta CDF **	pg	ND	7.1	60	12	0.500	3.55		5902066
1,2,3,4,7,8-Hexa CDF **	pg	ND	6.0	60	12	0.100	0.600		5902066
1,2,3,6,7,8-Hexa CDF **	pg	ND	5.9	60	12	0.100	0.590		5902066
2,3,4,6,7,8-Hexa CDF **	pg	ND	6.3	60	12	0.100	0.630		5902066
1,2,3,7,8,9-Hexa CDF **	pg	ND	6.9	60	12	0.100	0.690		5902066
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	5.9	60	18	0.0100	0.0590		5902066
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	7.3	60	12	0.0100	0.0730		5902066
1,2,3,4,6,7,8,9-Octa CDF **	pg	ND	6.6	600	30	0.00100	0.00660		5902066
Total Tetra CDF **	pg	ND (1)	9.1	60	N/A			0	5902066
Total Penta CDF **	pg	ND	7.1	60	N/A			0	5902066
Total Hexa CDF **	pg	ND	6.3	60	N/A			0	5902066
Total Hepta CDF **	pg	ND	6.5	60	N/A			0	5902066
TOTAL TOXIC EQUIVALENCY	pg						18.9		

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
NATO(1989) North Atlantic Treaty Organization/Committee on the Challenges of Modern Society (NATO/CCMS) International Toxicity Equivalency Factors (I-TEF)
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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Maxxam Job #: B8X2103
Report Date: 2019/01/04

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (STACK SAMPLING TRAIN)

Maxxam ID		INM727							
Sampling Date									
COC Number		30742				TOXIC EQUIVALENCY		# of	
	UNITS	**SVOC- BLANK**	**EDL**	**RDL**	**MDL**	**TEF (NATO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	95							5902066
C13-1234678 HeptaCDF **	%	92							5902066
C13-123478 HexaCDD *	%	111							5902066
C13-123478 HexaCDF **	%	107							5902066
C13-1234789 HeptaCDF **	%	106							5902066
C13-123678 HexaCDD *	%	100							5902066
C13-123678 HexaCDF **	%	87							5902066
C13-12378 PentaCDD *	%	118							5902066
C13-12378 PentaCDF **	%	101							5902066
C13-123789 HexaCDF **	%	84							5902066
C13-23478 PentaCDF **	%	108							5902066
C13-2378 TetraCDD *	%	107							5902066
C13-2378 TetraCDF **	%	96							5902066
C13-Octachlorodibenzo-p-Dioxin	%	82							5902066
Cl37-2378 TetraCDD *	%	89							5902066

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
NATO(1989) North Atlantic Treaty Organization/Committee on the Challenges of Modern Society (NATO/CCMS) International Toxicity Equivalency Factors (I-TEF)
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8X2103
Report Date: 2019/01/04

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (STACK SAMPLING TRAIN)

Maxxam ID		INM731							
Sampling Date		2018/12/04							
COC Number		30742				**TOXIC EQUIVALENCY**		# of	
	UNITS	**SVOC- ALTFUEL-T1**	**EDL**	**RDL**	**MDL**	**TEF (NATO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	ND	6.9	60	12	1.00	6.90		5902066
1,2,3,7,8-Penta CDD *	pg	ND	6.7	60	12	0.500	3.35		5902066
1,2,3,4,7,8-Hexa CDD *	pg	ND	6.1	60	12	0.100	0.610		5902066
1,2,3,6,7,8-Hexa CDD *	pg	ND	6.2	60	12	0.100	0.620		5902066
1,2,3,7,8,9-Hexa CDD *	pg	ND	5.7	60	12	0.100	0.570		5902066
1,2,3,4,6,7,8-Hepta CDD *	pg	ND	6.2	60	18	0.0100	0.0620		5902066
1,2,3,4,6,7,8,9-Octa CDD *	pg	19.8	6.5	600	18	0.00100	0.0198		5902066
Total Tetra CDD *	pg	ND (1)	15	60	N/A			0	5902066
Total Penta CDD *	pg	ND (1)	8.4	60	N/A			0	5902066
Total Hexa CDD *	pg	ND (1)	42	60	N/A			0	5902066
Total Hepta CDD *	pg	ND	6.2	60	N/A			0	5902066
2,3,7,8-Tetra CDF **	pg	8.1	6.3	60	12	0.100	0.810		5902066
1,2,3,7,8-Penta CDF **	pg	ND	6.2	60	12	0.0500	0.310		5902066
2,3,4,7,8-Penta CDF **	pg	ND	6.2	60	12	0.500	3.10		5902066
1,2,3,4,7,8-Hexa CDF **	pg	ND	5.9	60	12	0.100	0.590		5902066
1,2,3,6,7,8-Hexa CDF **	pg	ND	5.9	60	12	0.100	0.590		5902066
2,3,4,6,7,8-Hexa CDF **	pg	ND	6.2	60	12	0.100	0.620		5902066
1,2,3,7,8,9-Hexa CDF **	pg	ND	6.8	60	12	0.100	0.680		5902066
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	5.5	60	18	0.0100	0.0550		5902066
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	6.8	60	12	0.0100	0.0680		5902066
1,2,3,4,6,7,8,9-Octa CDF **	pg	ND	7.1	600	30	0.00100	0.00710		5902066
Total Tetra CDF **	pg	36.6	6.3	60	N/A			4	5902066
Total Penta CDF **	pg	ND	6.2	60	N/A			0	5902066
Total Hexa CDF **	pg	ND	6.2	60	N/A			0	5902066
Total Hepta CDF **	pg	ND	6.1	60	N/A			0	5902066
TOTAL TOXIC EQUIVALENCY	pg						19.0		

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
NATO(1989) North Atlantic Treaty Organization/Committee on the Challenges of Modern Society (NATO/CCMS) International Toxicity Equivalency Factors (I-TEF)
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (STACK SAMPLING TRAIN)

Maxxam ID		INM731							
Sampling Date		2018/12/04							
COC Number		30742				**TOXIC EQUIVALENCY**		# of	
	UNITS	**SVOC- ALTFUEL-T1**	**EDL**	**RDL**	**MDL**	**TEF (NATO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	84							5902066
C13-1234678 HeptaCDF **	%	82							5902066
C13-123478 HexaCDD *	%	107							5902066
C13-123478 HexaCDF **	%	113							5902066
C13-1234789 HeptaCDF **	%	105							5902066
C13-123678 HexaCDD *	%	89							5902066
C13-123678 HexaCDF **	%	77							5902066
C13-12378 PentaCDD *	%	89							5902066
C13-12378 PentaCDF **	%	83							5902066
C13-123789 HexaCDF **	%	81							5902066
C13-23478 PentaCDF **	%	119							5902066
C13-2378 TetraCDD *	%	101							5902066
C13-2378 TetraCDF **	%	92							5902066
C13-Octachlorodibenzo-p-Dioxin	%	84							5902066
Cl37-2378 TetraCDD *	%	91							5902066

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
NATO(1989) North Atlantic Treaty Organization/Committee on the Challenges of Modern Society (NATO/CCMS) International Toxicity Equivalency Factors (I-TEF)
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8X2103
Report Date: 2019/01/04

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (STACK SAMPLING TRAIN)

Maxxam ID		INM732							
Sampling Date		2018/12/05							
COC Number		30742				**TOXIC EQUIVALENCY**		# of	
	UNITS	**SVOC- ALTFUEL-T2**	**EDL**	**RDL**	**MDL**	**TEF (NATO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	ND	6.4	60	12	1.00	6.40		5902066
1,2,3,7,8-Penta CDD *	pg	ND	6.8	60	12	0.500	3.40		5902066
1,2,3,4,7,8-Hexa CDD *	pg	ND	6.4	60	12	0.100	0.640		5902066
1,2,3,6,7,8-Hexa CDD *	pg	ND	6.5	60	12	0.100	0.650		5902066
1,2,3,7,8,9-Hexa CDD *	pg	ND	6.0	60	12	0.100	0.600		5902066
1,2,3,4,6,7,8-Hepta CDD *	pg	ND	7.0	60	18	0.0100	0.0700		5902066
1,2,3,4,6,7,8,9-Octa CDD *	pg	8.8 (1)	6.1	600	18	0.00100	0.00880		5902066
Total Tetra CDD *	pg	ND (2)	13	60	N/A			0	5902066
Total Penta CDD *	pg	ND (2)	8.4	60	N/A			0	5902066
Total Hexa CDD *	pg	ND (3)	37	60	N/A			0	5902066
Total Hepta CDD *	pg	ND	7.0	60	N/A			0	5902066
2,3,7,8-Tetra CDF **	pg	7.5	6.1	60	12	0.100	0.750		5902066
1,2,3,7,8-Penta CDF **	pg	ND	6.4	60	12	0.0500	0.320		5902066
2,3,4,7,8-Penta CDF **	pg	ND	6.4	60	12	0.500	3.20		5902066
1,2,3,4,7,8-Hexa CDF **	pg	ND	6.0	60	12	0.100	0.600		5902066
1,2,3,6,7,8-Hexa CDF **	pg	ND	5.9	60	12	0.100	0.590		5902066
2,3,4,6,7,8-Hexa CDF **	pg	ND	6.3	60	12	0.100	0.630		5902066
1,2,3,7,8,9-Hexa CDF **	pg	ND	6.9	60	12	0.100	0.690		5902066
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	5.5	60	18	0.0100	0.0550		5902066
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	6.8	60	12	0.0100	0.0680		5902066
1,2,3,4,6,7,8,9-Octa CDF **	pg	ND	6.1	600	30	0.00100	0.00610		5902066
Total Tetra CDF **	pg	22.5	6.1	60	N/A			3	5902066
Total Penta CDF **	pg	ND	6.4	60	N/A			0	5902066
Total Hexa CDF **	pg	ND	6.2	60	N/A			0	5902066
Total Hepta CDF **	pg	ND	6.1	60	N/A			0	5902066

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
NATO(1989) North Atlantic Treaty Organization/Committee on the Challenges of Modern Society (NATO/CCMS) International Toxicity Equivalency Factors (I-TEF)
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan
(1) EMPC / Ratio - Isotopic ratio adjusted to meet theoretical
(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.
(3) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.v

Maxxam Job #: B8X2103
Report Date: 2019/01/04

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (STACK SAMPLING TRAIN)

Maxxam ID		INM732							
Sampling Date		2018/12/05							
COC Number		30742				**TOXIC EQUIVALENCY**		# of	
	UNITS	**SVOC- ALTFUEL-T2**	**EDL**	**RDL**	**MDL**	**TEF (NATO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
TOTAL TOXIC EQUIVALENCY	pg						18.7		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	94							5902066
C13-1234678 HeptaCDF **	%	86							5902066
C13-123478 HexaCDD *	%	109							5902066
C13-123478 HexaCDF **	%	104							5902066
C13-1234789 HeptaCDF **	%	113							5902066
C13-123678 HexaCDD *	%	98							5902066
C13-123678 HexaCDF **	%	78							5902066
C13-12378 PentaCDD *	%	96							5902066
C13-12378 PentaCDF **	%	90							5902066
C13-123789 HexaCDF **	%	77							5902066
C13-23478 PentaCDF **	%	121							5902066
C13-2378 TetraCDD *	%	106							5902066
C13-2378 TetraCDF **	%	94							5902066
C13-Octachlorodibenzo-p-Dioxin	%	87							5902066
Cl37-2378 TetraCDD *	%	90							5902066

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
NATO(1989) North Atlantic Treaty Organization/Committee on the Challenges of Modern Society (NATO/CCMS) International Toxicity Equivalency Factors (I-TEF)
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B8X2103
Report Date: 2019/01/04

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (STACK SAMPLING TRAIN)

Maxxam ID		INM733							
Sampling Date		2018/12/06							
COC Number		30742				**TOXIC EQUIVALENCY**		# of	
	UNITS	**SVOC- ALTFUEL-T3**	**EDL**	**RDL**	**MDL**	**TEF (NATO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	ND	6.2	60	12	1.00	6.20		5902066
1,2,3,7,8-Penta CDD *	pg	ND	6.9	60	12	0.500	3.45		5902066
1,2,3,4,7,8-Hexa CDD *	pg	ND	7.1	60	12	0.100	0.710		5902066
1,2,3,6,7,8-Hexa CDD *	pg	7.6	7.2	60	12	0.100	0.760		5902066
1,2,3,7,8,9-Hexa CDD *	pg	ND	6.6	60	12	0.100	0.660		5902066
1,2,3,4,6,7,8-Hepta CDD *	pg	10.7	6.4	60	18	0.0100	0.107		5902066
1,2,3,4,6,7,8,9-Octa CDD *	pg	47.2	6.6	600	18	0.00100	0.0472		5902066
Total Tetra CDD *	pg	ND (1)	14	60	N/A			0	5902066
Total Penta CDD *	pg	ND (1)	7.2	60	N/A			0	5902066
Total Hexa CDD *	pg	7.6	7.0	60	N/A			1	5902066
Total Hepta CDD *	pg	10.7	6.4	60	N/A			1	5902066
2,3,7,8-Tetra CDF **	pg	8.4	6.7	60	12	0.100	0.840		5902066
1,2,3,7,8-Penta CDF **	pg	9.8	6.9	60	12	0.0500	0.490		5902066
2,3,4,7,8-Penta CDF **	pg	7.2 (2)	6.8	60	12	0.500	3.60		5902066
1,2,3,4,7,8-Hexa CDF **	pg	7.5	5.9	60	12	0.100	0.750		5902066
1,2,3,6,7,8-Hexa CDF **	pg	7.4 (2)	5.8	60	12	0.100	0.740		5902066
2,3,4,6,7,8-Hexa CDF **	pg	ND	6.2	60	12	0.100	0.620		5902066
1,2,3,7,8,9-Hexa CDF **	pg	9.5 (2)	6.8	60	12	0.100	0.950		5902066
1,2,3,4,6,7,8-Hepta CDF **	pg	8.2 (2)	5.9	60	18	0.0100	0.0820		5902066
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	7.3	60	12	0.0100	0.0730		5902066
1,2,3,4,6,7,8,9-Octa CDF **	pg	13.0	6.4	600	30	0.00100	0.0130		5902066
Total Tetra CDF **	pg	8.4	6.7	60	N/A			1	5902066
Total Penta CDF **	pg	17.1	6.9	60	N/A			2	5902066
Total Hexa CDF **	pg	24.5	6.2	60	N/A			3	5902066
Total Hepta CDF **	pg	8.2 (2)	6.5	60	N/A			1	5902066
TOTAL TOXIC EQUIVALENCY	pg						20.1		

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
NATO(1989) North Atlantic Treaty Organization/Committee on the Challenges of Modern Society (NATO/CCMS) International Toxicity Equivalency Factors (I-TEF)
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.
(2) EMPC / Ratio - Isotopic ratio adjusted to meet theoretical

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B8X2103
Report Date: 2019/01/04

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (STACK SAMPLING TRAIN)

Maxxam ID		INM733							
Sampling Date		2018/12/06							
COC Number		30742				TOXIC EQUIVALENCY		# of	
	UNITS	**SVOC- ALTFUEL-T3**	**EDL**	**RDL**	**MDL**	**TEF (NATO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	96							5902066
C13-1234678 HeptaCDF **	%	85							5902066
C13-123478 HexaCDD *	%	103							5902066
C13-123478 HexaCDF **	%	112							5902066
C13-1234789 HeptaCDF **	%	113							5902066
C13-123678 HexaCDD *	%	94							5902066
C13-123678 HexaCDF **	%	78							5902066
C13-12378 PentaCDD *	%	91							5902066
C13-12378 PentaCDF **	%	87							5902066
C13-123789 HexaCDF **	%	84							5902066
C13-23478 PentaCDF **	%	115							5902066
C13-2378 TetraCDD *	%	99							5902066
C13-2378 TetraCDF **	%	89							5902066
C13-Octachlorodibenzo-p-Dioxin	%	95							5902066
Cl37-2378 TetraCDD *	%	94							5902066

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
NATO(1989) North Atlantic Treaty Organization/Committee on the Challenges of Modern Society (NATO/CCMS) International Toxicity Equivalency Factors (I-TEF)
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8X2103
Report Date: 2019/01/04

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (STACK SAMPLING TRAIN)

Maxxam ID		INM855							
Sampling Date		2018/12/07							
COC Number		30742				**TOXIC EQUIVALENCY**		# of	
	UNITS	**SVOC- BASELINE-T1**	**EDL**	**RDL**	**MDL**	**TEF (NATO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	ND	6.9	60	12	1.00	6.90		5902066
1,2,3,7,8-Penta CDD *	pg	ND	6.9	60	12	0.500	3.45		5902066
1,2,3,4,7,8-Hexa CDD *	pg	ND	6.5	60	12	0.100	0.650		5902066
1,2,3,6,7,8-Hexa CDD *	pg	ND	6.6	60	12	0.100	0.660		5902066
1,2,3,7,8,9-Hexa CDD *	pg	ND	6.1	60	12	0.100	0.610		5902066
1,2,3,4,6,7,8-Hepta CDD *	pg	ND	6.3	60	18	0.0100	0.0630		5902066
1,2,3,4,6,7,8,9-Octa CDD *	pg	9.4	6.5	600	18	0.00100	0.00940		5902066
Total Tetra CDD *	pg	ND (1)	16	60	N/A			0	5902066
Total Penta CDD *	pg	ND (1)	13	60	N/A			0	5902066
Total Hexa CDD *	pg	ND (1)	51	60	N/A			0	5902066
Total Hepta CDD *	pg	ND	6.3	60	N/A			0	5902066
2,3,7,8-Tetra CDF **	pg	ND	6.6	60	12	0.100	0.660		5902066
1,2,3,7,8-Penta CDF **	pg	ND	6.5	60	12	0.0500	0.325		5902066
2,3,4,7,8-Penta CDF **	pg	ND	6.5	60	12	0.500	3.25		5902066
1,2,3,4,7,8-Hexa CDF **	pg	ND	6.1	60	12	0.100	0.610		5902066
1,2,3,6,7,8-Hexa CDF **	pg	ND	6.0	60	12	0.100	0.600		5902066
2,3,4,6,7,8-Hexa CDF **	pg	ND	6.4	60	12	0.100	0.640		5902066
1,2,3,7,8,9-Hexa CDF **	pg	ND	7.0	60	12	0.100	0.700		5902066
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	4.3	60	18	0.0100	0.0430		5902066
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	5.4	60	12	0.0100	0.0540		5902066
1,2,3,4,6,7,8,9-Octa CDF **	pg	ND	6.5	600	30	0.00100	0.00650		5902066
Total Tetra CDF **	pg	ND (1)	8.4	60	N/A			0	5902066
Total Penta CDF **	pg	ND	6.5	60	N/A			0	5902066
Total Hexa CDF **	pg	ND	6.3	60	N/A			0	5902066
Total Hepta CDF **	pg	ND	4.8	60	N/A			0	5902066
TOTAL TOXIC EQUIVALENCY	pg						19.2		

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
NATO(1989) North Atlantic Treaty Organization/Committee on the Challenges of Modern Society (NATO/CCMS) International Toxicity Equivalency Factors (I-TEF)
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B8X2103
Report Date: 2019/01/04

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (STACK SAMPLING TRAIN)

Maxxam ID		INM855							
Sampling Date		2018/12/07							
COC Number		30742				**TOXIC EQUIVALENCY**		# of	
	UNITS	**SVOC- BASELINE-T1**	**EDL**	**RDL**	**MDL**	**TEF (NATO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	93							5902066
C13-1234678 HeptaCDF **	%	89							5902066
C13-123478 HexaCDD *	%	111							5902066
C13-123478 HexaCDF **	%	107							5902066
C13-1234789 HeptaCDF **	%	108							5902066
C13-123678 HexaCDD *	%	94							5902066
C13-123678 HexaCDF **	%	85							5902066
C13-12378 PentaCDD *	%	94							5902066
C13-12378 PentaCDF **	%	92							5902066
C13-123789 HexaCDF **	%	83							5902066
C13-23478 PentaCDF **	%	110							5902066
C13-2378 TetraCDD *	%	105							5902066
C13-2378 TetraCDF **	%	94							5902066
C13-Octachlorodibenzo-p-Dioxin	%	94							5902066
Cl37-2378 TetraCDD *	%	94							5902066

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
NATO(1989) North Atlantic Treaty Organization/Committee on the Challenges of Modern Society (NATO/CCMS) International Toxicity Equivalency Factors (I-TEF)
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B8X2103
Report Date: 2019/01/04

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (STACK SAMPLING TRAIN)

Maxxam ID		INM856							
Sampling Date		2018/12/07							
COC Number		30742				**TOXIC EQUIVALENCY**		# of	
	UNITS	**SVOC- BASELINE-T2**	**EDL**	**RDL**	**MDL**	**TEF (NATO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	ND	6.2	60	12	1.00	6.20		5902066
1,2,3,7,8-Penta CDD *	pg	ND	6.8	60	12	0.500	3.40		5902066
1,2,3,4,7,8-Hexa CDD *	pg	ND	6.4	60	12	0.100	0.640		5902066
1,2,3,6,7,8-Hexa CDD *	pg	ND	6.5	60	12	0.100	0.650		5902066
1,2,3,7,8,9-Hexa CDD *	pg	ND	6.0	60	12	0.100	0.600		5902066
1,2,3,4,6,7,8-Hepta CDD *	pg	ND	7.0	60	18	0.0100	0.0700		5902066
1,2,3,4,6,7,8,9-Octa CDD *	pg	12.4	7.0	600	18	0.00100	0.0124		5902066
Total Tetra CDD *	pg	ND (1)	15	60	N/A			0	5902066
Total Penta CDD *	pg	ND (1)	13	60	N/A			0	5902066
Total Hexa CDD *	pg	ND (1)	28	60	N/A			0	5902066
Total Hepta CDD *	pg	ND	7.0	60	N/A			0	5902066
2,3,7,8-Tetra CDF **	pg	ND	6.1	60	12	0.100	0.610		5902066
1,2,3,7,8-Penta CDF **	pg	ND	6.9	60	12	0.0500	0.345		5902066
2,3,4,7,8-Penta CDF **	pg	ND	6.9	60	12	0.500	3.45		5902066
1,2,3,4,7,8-Hexa CDF **	pg	ND	6.0	60	12	0.100	0.600		5902066
1,2,3,6,7,8-Hexa CDF **	pg	ND	5.9	60	12	0.100	0.590		5902066
2,3,4,6,7,8-Hexa CDF **	pg	ND	6.3	60	12	0.100	0.630		5902066
1,2,3,7,8,9-Hexa CDF **	pg	ND	6.9	60	12	0.100	0.690		5902066
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	5.7	60	18	0.0100	0.0570		5902066
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	7.0	60	12	0.0100	0.0700		5902066
1,2,3,4,6,7,8,9-Octa CDF **	pg	ND	6.7	600	30	0.00100	0.00670		5902066
Total Tetra CDF **	pg	ND (1)	8.7	60	N/A			0	5902066
Total Penta CDF **	pg	ND	6.9	60	N/A			0	5902066
Total Hexa CDF **	pg	ND	6.2	60	N/A			0	5902066
Total Hepta CDF **	pg	ND	6.3	60	N/A			0	5902066
TOTAL TOXIC EQUIVALENCY	pg						18.6		

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

NATO(1989) North Atlantic Treaty Organization/Committee on the Challenges of Modern Society (NATO/CCMS) International Toxicity Equivalency Factors (I-TEF)

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

ND = Not detected

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B8X2103
Report Date: 2019/01/04

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (STACK SAMPLING TRAIN)

Maxxam ID		INM856							
Sampling Date		2018/12/07							
COC Number		30742				TOXIC EQUIVALENCY		# of	
	UNITS	**SVOC- BASELINE-T2**	**EDL**	**RDL**	**MDL**	**TEF (NATO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	90							5902066
C13-1234678 HeptaCDF **	%	86							5902066
C13-123478 HexaCDD *	%	103							5902066
C13-123478 HexaCDF **	%	112							5902066
C13-1234789 HeptaCDF **	%	98							5902066
C13-123678 HexaCDD *	%	99							5902066
C13-123678 HexaCDF **	%	79							5902066
C13-12378 PentaCDD *	%	100							5902066
C13-12378 PentaCDF **	%	93							5902066
C13-123789 HexaCDF **	%	81							5902066
C13-23478 PentaCDF **	%	114							5902066
C13-2378 TetraCDD *	%	109							5902066
C13-2378 TetraCDF **	%	100							5902066
C13-Octachlorodibenzo-p-Dioxin	%	73							5902066
Cl37-2378 TetraCDD *	%	95							5902066

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
NATO(1989) North Atlantic Treaty Organization/Committee on the Challenges of Modern Society (NATO/CCMS) International Toxicity Equivalency Factors (I-TEF)
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B8X2103
Report Date: 2019/01/04

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (STACK SAMPLING TRAIN)

Maxxam ID		INM857							
Sampling Date		2018/12/08							
COC Number		30742				**TOXIC EQUIVALENCY**		# of	
	UNITS	**SVOC- BASELINE-T3**	**EDL**	**RDL**	**MDL**	**TEF (NATO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	ND	7.1	60	12	1.00	7.10		5902066
1,2,3,7,8-Penta CDD *	pg	ND	6.3	60	12	0.500	3.15		5902066
1,2,3,4,7,8-Hexa CDD *	pg	ND	7.2	60	12	0.100	0.720		5902066
1,2,3,6,7,8-Hexa CDD *	pg	ND	7.3	60	12	0.100	0.730		5902066
1,2,3,7,8,9-Hexa CDD *	pg	ND	6.7	60	12	0.100	0.670		5902066
1,2,3,4,6,7,8-Hepta CDD *	pg	ND	7.0	60	18	0.0100	0.0700		5902066
1,2,3,4,6,7,8,9-Octa CDD *	pg	9.1	6.7	600	18	0.00100	0.00910		5902066
Total Tetra CDD *	pg	ND (1)	16	60	N/A			0	5902066
Total Penta CDD *	pg	ND (1)	7.6	60	N/A			0	5902066
Total Hexa CDD *	pg	ND (1)	29	60	N/A			0	5902066
Total Hepta CDD *	pg	ND	7.0	60	N/A			0	5902066
2,3,7,8-Tetra CDF **	pg	ND	6.9	60	12	0.100	0.690		5902066
1,2,3,7,8-Penta CDF **	pg	ND	7.0	60	12	0.0500	0.350		5902066
2,3,4,7,8-Penta CDF **	pg	ND	7.0	60	12	0.500	3.50		5902066
1,2,3,4,7,8-Hexa CDF **	pg	ND	6.4	60	12	0.100	0.640		5902066
1,2,3,6,7,8-Hexa CDF **	pg	ND	6.3	60	12	0.100	0.630		5902066
2,3,4,6,7,8-Hexa CDF **	pg	ND	6.7	60	12	0.100	0.670		5902066
1,2,3,7,8,9-Hexa CDF **	pg	ND	7.3	60	12	0.100	0.730		5902066
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	5.3	60	18	0.0100	0.0530		5902066
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	6.6	60	12	0.0100	0.0660		5902066
1,2,3,4,6,7,8,9-Octa CDF **	pg	ND	6.6	600	30	0.00100	0.00660		5902066
Total Tetra CDF **	pg	ND (1)	7.7	60	N/A			0	5902066
Total Penta CDF **	pg	ND	7.0	60	N/A			0	5902066
Total Hexa CDF **	pg	ND	6.6	60	N/A			0	5902066
Total Hepta CDF **	pg	ND	5.9	60	N/A			0	5902066
TOTAL TOXIC EQUIVALENCY	pg						19.8		

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
NATO(1989) North Atlantic Treaty Organization/Committee on the Challenges of Modern Society (NATO/CCMS) International Toxicity Equivalency Factors (I-TEF)
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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Maxxam Job #: B8X2103
Report Date: 2019/01/04

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (STACK SAMPLING TRAIN)

Maxxam ID		INM857							
Sampling Date		2018/12/08							
COC Number		30742				**TOXIC EQUIVALENCY**		# of	
	UNITS	**SVOC- BASELINE-T3**	**EDL**	**RDL**	**MDL**	**TEF (NATO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	81							5902066
C13-1234678 HeptaCDF **	%	74							5902066
C13-123478 HexaCDD *	%	110							5902066
C13-123478 HexaCDF **	%	109							5902066
C13-1234789 HeptaCDF **	%	102							5902066
C13-123678 HexaCDD *	%	93							5902066
C13-123678 HexaCDF **	%	78							5902066
C13-12378 PentaCDD *	%	92							5902066
C13-12378 PentaCDF **	%	87							5902066
C13-123789 HexaCDF **	%	80							5902066
C13-23478 PentaCDF **	%	112							5902066
C13-2378 TetraCDD *	%	102							5902066
C13-2378 TetraCDF **	%	91							5902066
C13-Octachlorodibenzo-p-Dioxin	%	71							5902066
Cl37-2378 TetraCDD *	%	91							5902066

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
NATO(1989) North Atlantic Treaty Organization/Committee on the Challenges of Modern Society (NATO/CCMS) International Toxicity Equivalency Factors (I-TEF)
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

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TEST SUMMARY

Maxxam ID: INM727
Sample ID: SVOC- BLANK
Matrix: Stack Sampling Train

Collected:
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chlorobenzenes in MM5 Trains (EPA M0010)	GC/MS	5891012	2018/12/15	2018/12/29	Fan (Carrie) Jiang
Chlorophenols in MM5 Trains (EPA M0010)	GC/MS	5891013	2018/12/15	2019/01/01	Fan (Carrie) Jiang
Dioxins/Furans in Air (Method 23)	HRMS/MS	5902066	2018/12/11	2018/12/22	Owen Cosby
PAH's in MM5 SamplingTrains (CARB429mod)	GC/MS	5891011	2018/12/15	2018/12/22	Fan (Carrie) Jiang
PCBs in a Sampling Train (1668Amod)	HRMS/MS	5891014	2018/12/15	2018/12/31	Cathy Xu

Maxxam ID: INM731
Sample ID: SVOC- ALTFUEL- T1
Matrix: Stack Sampling Train

Collected: 2018/12/04
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chlorobenzenes in MM5 Trains (EPA M0010)	GC/MS	5891012	2018/12/15	2018/12/29	Fan (Carrie) Jiang
Chlorophenols in MM5 Trains (EPA M0010)	GC/MS	5891013	2018/12/15	2019/01/01	Fan (Carrie) Jiang
Dioxins/Furans in Air (Method 23)	HRMS/MS	5902066	2018/12/11	2018/12/22	Owen Cosby
PAH's in MM5 SamplingTrains (CARB429mod)	GC/MS	5891011	2018/12/15	2018/12/22	Fan (Carrie) Jiang
PCBs in a Sampling Train (1668Amod)	HRMS/MS	5891014	2018/12/15	2018/12/31	Cathy Xu

Maxxam ID: INM732
Sample ID: SVOC- ALTFUEL- T2
Matrix: Stack Sampling Train

Collected: 2018/12/05
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chlorobenzenes in MM5 Trains (EPA M0010)	GC/MS	5891012	2018/12/15	2018/12/29	Fan (Carrie) Jiang
Chlorophenols in MM5 Trains (EPA M0010)	GC/MS	5891013	2018/12/15	2019/01/01	Fan (Carrie) Jiang
Dioxins/Furans in Air (Method 23)	HRMS/MS	5902066	2018/12/11	2018/12/22	Owen Cosby
PAH's in MM5 SamplingTrains (CARB429mod)	GC/MS	5891011	2018/12/15	2018/12/22	Fan (Carrie) Jiang
PCBs in a Sampling Train (1668Amod)	HRMS/MS	5891014	2018/12/15	2018/12/31	Cathy Xu

Maxxam ID: INM733
Sample ID: SVOC- ALTFUEL- T3
Matrix: Stack Sampling Train

Collected: 2018/12/06
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chlorobenzenes in MM5 Trains (EPA M0010)	GC/MS	5891012	2018/12/15	2018/12/29	Fan (Carrie) Jiang
Chlorophenols in MM5 Trains (EPA M0010)	GC/MS	5891013	2018/12/15	2019/01/02	Fan (Carrie) Jiang
Dioxins/Furans in Air (Method 23)	HRMS/MS	5902066	2018/12/11	2018/12/22	Owen Cosby
PAH's in MM5 SamplingTrains (CARB429mod)	GC/MS	5891011	2018/12/15	2018/12/22	Fan (Carrie) Jiang
PCBs in a Sampling Train (1668Amod)	HRMS/MS	5891014	2018/12/15	2018/12/31	Cathy Xu

Maxxam ID: INM855
Sample ID: SVOC- BASELINE- T1
Matrix: Stack Sampling Train

Collected: 2018/12/07
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chlorobenzenes in MM5 Trains (EPA M0010)	GC/MS	5891012	2018/12/15	2018/12/29	Fan (Carrie) Jiang
Chlorophenols in MM5 Trains (EPA M0010)	GC/MS	5891013	2018/12/15	2019/01/01	Fan (Carrie) Jiang
Dioxins/Furans in Air (Method 23)	HRMS/MS	5902066	2018/12/11	2018/12/22	Owen Cosby

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Report Date: 2019/01/04

RWDI Air Inc
Site Location: ST. MARYS

TEST SUMMARY

Maxxam ID: INM855
Sample ID: SVOC- BASELINE- T1
Matrix: Stack Sampling Train

Collected: 2018/12/07
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PAH's in MM5 SamplingTrains (CARB429mod)	GC/MS	5891011	2018/12/15	2018/12/22	Fan (Carrie) Jiang
PCBs in a Sampling Train (1668Amod)	HRMS/MS	5891014	2018/12/15	2018/12/31	Cathy Xu

Maxxam ID: INM856
Sample ID: SVOC- BASELINE- T2
Matrix: Stack Sampling Train

Collected: 2018/12/07
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chlorobenzenes in MM5 Trains (EPA M0010)	GC/MS	5891012	2018/12/15	2018/12/29	Fan (Carrie) Jiang
Chlorophenols in MM5 Trains (EPA M0010)	GC/MS	5891013	2018/12/15	2019/01/01	Fan (Carrie) Jiang
Dioxins/Furans in Air (Method 23)	HRMS/MS	5902066	2018/12/11	2018/12/22	Owen Cosby
PAH's in MM5 SamplingTrains (CARB429mod)	GC/MS	5891011	2018/12/15	2018/12/22	Fan (Carrie) Jiang
PCBs in a Sampling Train (1668Amod)	HRMS/MS	5891014	2018/12/15	2018/12/31	Cathy Xu

Maxxam ID: INM857
Sample ID: SVOC- BASELINE- T3
Matrix: Stack Sampling Train

Collected: 2018/12/08
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chlorobenzenes in MM5 Trains (EPA M0010)	GC/MS	5891012	2018/12/15	2018/12/30	Fan (Carrie) Jiang
Chlorophenols in MM5 Trains (EPA M0010)	GC/MS	5891013	2018/12/15	2019/01/02	Fan (Carrie) Jiang
Dioxins/Furans in Air (Method 23)	HRMS/MS	5902066	2018/12/11	2018/12/22	Owen Cosby
PAH's in MM5 SamplingTrains (CARB429mod)	GC/MS	5891011	2018/12/15	2018/12/22	Fan (Carrie) Jiang
PCBs in a Sampling Train (1668Amod)	HRMS/MS	5891014	2018/12/15	2018/12/31	Cathy Xu

GENERAL COMMENTS

Dibenzo(a,c) anthracene, Triphenylene and Picene : These parameters are not accredited for the submitted matrix. Triphenylene co-elutes with Chrysene and Dibenzo(a,c)anthracene co-elutes with Dibenz(a,h)anthracene. The data reported is the total of the 2 compounds if both are present.

Benzo(b)fluoranthene and Benzo(j)fluoranthene co-elute. The data reported is the total of the 2 compounds if both are present.

Due to high concentration of Tetralin, Naphthalene, 2-Methylnaphthalene and 1-Methylnaphthalene, sample required dilution. Detection limits for these compounds were adjusted accordingly.

Sample INM727 [SVOC- BLANK] : Impinger extracted past holdtime. Data should be reviewed with discretion.

Sample INM732 [SVOC- ALTFUEL- T2] : D10-Anthracene, D10-Fluorene and D14-Terphenyl recoveries were below the lower control limit due to matrix interference. This may represent a low bias in some results.

Sample INM733 [SVOC- ALTFUEL- T3] : D10-Fluorene and D14-Terphenyl recoveries were below the lower control limit due to matrix interference. This may represent a low bias in some results.

Sample INM855 [SVOC- BASELINE- T1] : D10-Fluorene and D14-Terphenyl recoveries were below the lower control limit due to matrix interference. This may represent a low bias in some results.

Chlorophenols analysis: Sample reanalyzed using a smaller amount so the detection limits were raised accordingly.

Sample INM856 [SVOC- BASELINE- T2] : D10-Fluorene and D14-Terphenyl recoveries were below the lower control limit due to matrix interference. This may represent a low bias in some results.

Chlorophenols analysis: Sample reanalyzed using a smaller amount so the detection limits were raised accordingly.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5891011	FJI	Spiked Blank	D10-2-Methylnaphthalene	2018/12/22		98	%	50 - 150
			D10-Fluoranthene	2018/12/22		106	%	50 - 150
			D10-Phenanthrene	2018/12/22		102	%	50 - 150
			D12-Benzo(a)anthracene	2018/12/22		100	%	50 - 150
			D12-Benzo(a)pyrene	2018/12/22		84	%	50 - 150
			D12-Benzo(b)fluoranthene	2018/12/22		94	%	50 - 150
			D12-Benzo(ghi)perylene	2018/12/22		98	%	50 - 150
			D12-Benzo(k)fluoranthene	2018/12/22		106	%	50 - 150
			D12-Chrysene	2018/12/22		96	%	50 - 150
			D12-Indeno(1,2,3-cd)pyrene	2018/12/22		100	%	50 - 150
			D12-Perylene	2018/12/22		84	%	50 - 150
			D14-Dibenzo(a,h)anthracene	2018/12/22		98	%	50 - 150
			D8-Acenaphthylene	2018/12/22		96	%	50 - 150
			D8-Naphthalene	2018/12/22		94	%	50 - 150
			Acenaphthene	2018/12/22		103	%	60 - 130
			Acenaphthylene	2018/12/22		100	%	60 - 130
			Anthracene	2018/12/22		93	%	60 - 130
			Benzo(a)anthracene	2018/12/22		100	%	60 - 130
			Benzo(a)pyrene	2018/12/22		93	%	60 - 130
			Benzo(b)fluoranthene	2018/12/22		93	%	60 - 130
			Benzo(g,h,i)perylene	2018/12/22		103	%	60 - 130
			Benzo(k)fluoranthene	2018/12/22		115	%	60 - 130
			Chrysene	2018/12/22		105	%	60 - 130
			Fluoranthene	2018/12/22		110	%	60 - 130
			Fluorene	2018/12/22		108	%	60 - 130
			Indeno(1,2,3-cd)pyrene	2018/12/22		108	%	60 - 130
			Naphthalene	2018/12/22		100	%	60 - 130
			Phenanthrene	2018/12/22		110	%	60 - 130
			Pyrene	2018/12/22		105	%	60 - 130
5891011	FJI	RPD	Acenaphthene	2018/12/22	0		%	50
			Acenaphthylene	2018/12/22	2.5		%	50
			Anthracene	2018/12/22	2.7		%	50
			Benzo(a)anthracene	2018/12/22	0		%	50
			Benzo(a)pyrene	2018/12/22	2.7		%	50
			Benzo(b)fluoranthene	2018/12/22	0		%	50
			Benzo(g,h,i)perylene	2018/12/22	2.5		%	50
			Benzo(k)fluoranthene	2018/12/22	2.2		%	50
			Chrysene	2018/12/22	2.4		%	50
			Fluoranthene	2018/12/22	0		%	50
			Fluorene	2018/12/22	2.4		%	50
			Indeno(1,2,3-cd)pyrene	2018/12/22	2.4		%	50
			Naphthalene	2018/12/22	2.5		%	50
			Phenanthrene	2018/12/22	2.3		%	50
			Pyrene	2018/12/22	0		%	50
5891011	FJI	Method Blank	D10-2-Methylnaphthalene	2018/12/22		100	%	50 - 150
			D10-Fluoranthene	2018/12/22		106	%	50 - 150
			D10-Phenanthrene	2018/12/22		102	%	50 - 150
			D12-Benzo(a)anthracene	2018/12/22		102	%	50 - 150
			D12-Benzo(a)pyrene	2018/12/22		84	%	50 - 150
			D12-Benzo(b)fluoranthene	2018/12/22		96	%	50 - 150
			D12-Benzo(ghi)perylene	2018/12/22		98	%	50 - 150
			D12-Benzo(k)fluoranthene	2018/12/22		106	%	50 - 150
			D12-Chrysene	2018/12/22		100	%	50 - 150
			D12-Indeno(1,2,3-cd)pyrene	2018/12/22		100	%	50 - 150
			D12-Perylene	2018/12/22		88	%	50 - 150

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RWDI Air Inc
Site Location: ST. MARYS

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			D14-Dibenzo(a,h)anthracene	2018/12/22		100	%	50 - 150
			D8-Acenaphthylene	2018/12/22		102	%	50 - 150
			D8-Naphthalene	2018/12/22		96	%	50 - 150
			1-Methylnaphthalene	2018/12/22	ND, RDL=0.30		ug	
			1-Methylphenanthrene	2018/12/22	ND, RDL=0.30		ug	
			2-Chloronaphthalene	2018/12/22	ND, RDL=0.30		ug	
			2-Methylanthracene	2018/12/22	ND, RDL=0.30		ug	
			2-Methylnaphthalene	2018/12/22	ND, RDL=0.30		ug	
			3-Methylcholanthrene	2018/12/22	ND, RDL=0.30		ug	
			7,12-Dimethylbenzo(a)anthracene	2018/12/22	ND, RDL=1.2		ug	
			9,10-Dimethylanthracene	2018/12/22	ND, RDL=0.30		ug	
			9-Methylphenanthrene	2018/12/22	ND, RDL=0.30		ug	
			Acenaphthene	2018/12/22	ND, RDL=0.30		ug	
			Acenaphthylene	2018/12/22	ND, RDL=0.30		ug	
			Anthracene	2018/12/22	ND, RDL=0.30		ug	
			Benzo(a)anthracene	2018/12/22	ND, RDL=0.30		ug	
			Benzo(a)fluorene	2018/12/22	ND, RDL=0.30		ug	
			Benzo(a)pyrene	2018/12/22	ND, RDL=0.30		ug	
			Benzo(b)fluoranthene	2018/12/22	ND, RDL=0.30		ug	
			Benzo(b)fluorene	2018/12/22	ND, RDL=0.30		ug	
			Benzo(e)pyrene	2018/12/22	ND, RDL=0.30		ug	
			Benzo(g,h,i)perylene	2018/12/22	ND, RDL=0.30		ug	
			Benzo(k)fluoranthene	2018/12/22	ND, RDL=0.30		ug	
			Chrysene	2018/12/22	ND, RDL=0.30		ug	
			Coronene	2018/12/22	ND, RDL=0.30		ug	
			Dibenzo(a,c)anthracene	2018/12/22	ND, RDL=0.30		ug	
			Fluoranthene	2018/12/22	ND, RDL=0.30		ug	
			Fluorene	2018/12/22	ND, RDL=0.30		ug	
			Indeno(1,2,3-cd)pyrene	2018/12/22	ND, RDL=0.30		ug	

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RWDI Air Inc
Site Location: ST. MARYS

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Naphthalene	2018/12/22	ND, RDL=0.30		ug	
			Perylene	2018/12/22	ND, RDL=0.30		ug	
			Phenanthrene	2018/12/22	ND, RDL=0.30		ug	
			Picene	2018/12/22	ND, RDL=0.30		ug	
			Pyrene	2018/12/22	ND, RDL=0.30		ug	
			Tetralin	2018/12/22	ND, RDL=0.30		ug	
			Triphenylene	2018/12/22	ND, RDL=0.30		ug	
5891012	FJI	Spiked Blank	1,2,3,4-Tetrachlorobenzene	2018/12/29		82	%	40 - 130
			1,2,3,5+1,2,4,5-Tetrachlorobenzene	2018/12/29		40	%	40 - 130
			1,2,3-Trichlorobenzene	2018/12/29		74	%	40 - 130
			1,2,4-Trichlorobenzene	2018/12/29		69	%	40 - 130
			1,2-Dichlorobenzene	2018/12/29		62	%	40 - 130
			1,3,5-Trichlorobenzene	2018/12/29		74	%	40 - 130
			1,3-Dichlorobenzene	2018/12/29		55	%	40 - 130
			1,4-Dichlorobenzene	2018/12/29		79	%	40 - 130
			13C6-Hexachlorobenzene	2018/12/29		75	%	30 - 130
			2H3-1,2,4-Trichlorobenzene	2018/12/29		67	%	30 - 130
			2H4-1,3-Dichlorobenzene	2018/12/29		60	%	30 - 130
			Hexachlorobenzene	2018/12/29		98	%	40 - 130
			Pentachlorobenzene	2018/12/29		87	%	40 - 130
5891012	FJI	RPD	1,2,3,4-Tetrachlorobenzene	2018/12/29	19		%	50
			1,2,3,5+1,2,4,5-Tetrachlorobenzene	2018/12/29	21		%	50
			1,2,3-Trichlorobenzene	2018/12/29	24		%	50
			1,2,4-Trichlorobenzene	2018/12/29	23		%	50
			1,2-Dichlorobenzene	2018/12/29	37		%	50
			1,3,5-Trichlorobenzene	2018/12/29	26		%	50
			1,3-Dichlorobenzene	2018/12/29	34		%	50
			1,4-Dichlorobenzene	2018/12/29	22		%	50
			Hexachlorobenzene	2018/12/29	1.2		%	50
			Pentachlorobenzene	2018/12/29	20		%	50
5891012	FJI	Method Blank	1,2,3,4-Tetrachlorobenzene	2018/12/29	ND, RDL=0.30		ug	
			1,2,3,5+1,2,4,5-Tetrachlorobenzene	2018/12/29	ND, RDL=0.30		ug	
			1,2,3-Trichlorobenzene	2018/12/29	ND, RDL=0.30		ug	
			1,2,4-Trichlorobenzene	2018/12/29	ND, RDL=0.30		ug	
			1,2-Dichlorobenzene	2018/12/29	ND, RDL=0.30		ug	
			1,3,5-Trichlorobenzene	2018/12/29	ND, RDL=0.30		ug	
			1,3-Dichlorobenzene	2018/12/29	ND, RDL=0.30		ug	
			1,4-Dichlorobenzene	2018/12/29	ND, RDL=0.30		ug	
			13C6-Hexachlorobenzene	2018/12/29		82	%	30 - 130
			2H3-1,2,4-Trichlorobenzene	2018/12/29		74	%	30 - 130

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			2H4-1,3-Dichlorobenzene	2018/12/29		66	%	30 - 130
			Hexachlorobenzene	2018/12/29	ND, RDL=0.30		ug	
			Pentachlorobenzene	2018/12/29	ND, RDL=0.30		ug	
5891013	FJI	Spiked Blank	2,3,4,5-Tetrachlorophenol	2019/01/02		102	%	22 - 134
			2,3,4-Trichlorophenol	2019/01/02		110	%	22 - 134
			2,3,5-Trichlorophenol	2019/01/02		129	%	22 - 134
			2,4 + 2,5-Dichlorophenol	2019/01/02		91	%	22 - 134
			2,4,6-Trichlorophenol	2019/01/02		105	%	22 - 134
			2,6-Dichlorophenol	2019/01/02		95	%	22 - 134
			2-Chlorophenol	2019/01/02		97	%	22 - 134
			3,4,5-Trichlorophenol	2019/01/02		119	%	22 - 134
			3,4-Dichlorophenol	2019/01/02		113	%	22 - 134
			3,5-Dichlorophenol	2019/01/02		109	%	22 - 134
			4-Chlorophenol	2019/01/02		90	%	22 - 134
			D3-2,4-Dichlorophenol	2019/01/02		83	%	20 - 130
			D6-Pentachlorophenol	2019/01/02		87	%	20 - 130
			Pentachlorophenol	2019/01/02		123	%	22 - 134
			2,3,4,6-Tetrachlorophenol	2019/01/02		108	%	22 - 134
			2,3,5,6-Tetrachlorophenol	2019/01/02		130	%	22 - 134
			2,3,6-Trichlorophenol	2019/01/02		110	%	22 - 134
			2,3-Dichlorophenol	2019/01/02		104	%	22 - 134
			2,4,5-Trichlorophenol	2019/01/02		106	%	22 - 134
			3-Chlorophenol	2019/01/02		110	%	22 - 134
5891013	FJI	RPD	2,3,4,5-Tetrachlorophenol	2019/01/02	9.1		%	50
			2,3,4-Trichlorophenol	2019/01/02	7.5		%	50
			2,3,5-Trichlorophenol	2019/01/02	12		%	50
			2,4 + 2,5-Dichlorophenol	2019/01/02	1.6		%	50
			2,4,6-Trichlorophenol	2019/01/02	1.3		%	50
			2,6-Dichlorophenol	2019/01/02	0.55		%	50
			2-Chlorophenol	2019/01/02	20		%	50
			3,4,5-Trichlorophenol	2019/01/02	12		%	50
			3,4-Dichlorophenol	2019/01/02	0.91		%	50
			3,5-Dichlorophenol	2019/01/02	4.7		%	50
			4-Chlorophenol	2019/01/02	1.6		%	50
			Pentachlorophenol	2019/01/02	12		%	50
			2,3,4,6-Tetrachlorophenol	2019/01/02	7.9		%	50
			2,3,5,6-Tetrachlorophenol	2019/01/02	0.023		%	50
			2,3,6-Trichlorophenol	2019/01/02	8.8		%	50
			2,3-Dichlorophenol	2019/01/02	0.51		%	50
			2,4,5-Trichlorophenol	2019/01/02	3.6		%	50
			3-Chlorophenol	2019/01/02	22		%	50
5891013	FJI	Method Blank	2,3,4,5-Tetrachlorophenol	2019/01/01	ND, RDL=0.30		ug	
			2,3,4-Trichlorophenol	2019/01/01	ND, RDL=0.30		ug	
			2,3,5-Trichlorophenol	2019/01/01	ND, RDL=0.30		ug	
			2,4 + 2,5-Dichlorophenol	2019/01/01	ND, RDL=0.30		ug	
			2,4,6-Trichlorophenol	2019/01/01	ND, RDL=0.30		ug	
			2,6-Dichlorophenol	2019/01/01	ND, RDL=0.30		ug	

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			2-Chlorophenol	2019/01/01	ND, RDL=0.30		ug	
			3,4,5-Trichlorophenol	2019/01/01	ND, RDL=0.30		ug	
			3,4-Dichlorophenol	2019/01/01	ND, RDL=0.30		ug	
			3,5-Dichlorophenol	2019/01/01	ND, RDL=0.30		ug	
			4-Chlorophenol	2019/01/01	ND, RDL=0.30		ug	
			D3-2,4-Dichlorophenol	2019/01/01		93	%	20 - 130
			D6-Pentachlorophenol	2019/01/01		94	%	20 - 130
			Pentachlorophenol	2019/01/01	ND, RDL=0.30		ug	
			2,3,4,6-Tetrachlorophenol	2019/01/01	ND, RDL=0.30		ug	
			2,3,5,6-Tetrachlorophenol	2019/01/01	ND, RDL=0.30		ug	
			2,3,6-Trichlorophenol	2019/01/01	ND, RDL=0.30		ug	
			2,3-Dichlorophenol	2019/01/01	ND, RDL=0.30		ug	
			2,4,5-Trichlorophenol	2019/01/01	ND, RDL=0.30		ug	
			3-Chlorophenol	2019/01/01	ND, RDL=0.30		ug	
5891014	CXU	Spiked Blank	C13-233'44'55'-HeptaCB-(189)	2018/12/31		115	%	30 - 140
			C13-233'44'5-HexaCB-(156)	2018/12/31		108	%	30 - 140
			C13-233'44'5'-HexaCB-(157)	2018/12/31		108	%	30 - 140
			C13-233'44'-PentaCB-(105)	2018/12/31		116	%	30 - 140
			C13-23'44'55'-HexaCB-(167)	2018/12/31		108	%	30 - 140
			C13-2344'5-PentaCB-(114)	2018/12/31		116	%	30 - 140
			C13-23'44'5-PentaCB-(118)	2018/12/31		118	%	30 - 140
			C13-2'344'5-PentaCB-(123)	2018/12/31		116	%	30 - 140
			C13-33'44'55'-HexaCB-(169)	2018/12/31		89	%	30 - 140
			C13-33'44'5-PentaCB-(126)	2018/12/31		112	%	30 - 140
			C13-33'44'-TetraCB-(77)	2018/12/31		109	%	30 - 140
			C13-344'5-TetraCB-(81)	2018/12/31		115	%	30 - 140
			33'44'-TetraCB-(77)	2018/12/31		99	%	50 - 150
			344'5-TetraCB-(81)	2018/12/31		97	%	50 - 150
			233'44'-PentaCB-(105)	2018/12/31		98	%	50 - 150
			2344'5-PentaCB-(114)	2018/12/31		99	%	50 - 150
			23'44'5-PentaCB-(118)	2018/12/31		99	%	50 - 150
			23'44'5'-PentaCB-(123)	2018/12/31		99	%	50 - 150
			33'44'5-PentaCB-(126)	2018/12/31		100	%	50 - 150
			HexaCB-(156)+(157)	2018/12/31		98	%	N/A
			23'44'55'-HexaCB-(167)	2018/12/31		101	%	50 - 150
			33'44'55'-HexaCB-(169)	2018/12/31		98	%	50 - 150
			233'44'55'-HeptaCB-(189)	2018/12/31		97	%	50 - 150
5891014	CXU	RPD	33'44'-TetraCB-(77)	2018/12/31	1.0		%	30
			344'5-TetraCB-(81)	2018/12/31	3.0		%	30
			233'44'-PentaCB-(105)	2018/12/31	3.0		%	30
			2344'5-PentaCB-(114)	2018/12/31	0		%	30
			23'44'5-PentaCB-(118)	2018/12/31	2.0		%	30
			23'44'5'-PentaCB-(123)	2018/12/31	1.0		%	30

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			33'44'5-PentaCB-(126)	2018/12/31	0		%	30
			HexaCB-(156)+(157)	2018/12/31	2.0		%	30
			23'44'55'-HexaCB-(167)	2018/12/31	1.0		%	30
			33'44'55'-HexaCB-(169)	2018/12/31	2.0		%	30
			233'44'55'-HeptaCB-(189)	2018/12/31	1.0		%	30
5891014	CXU	Method Blank	C13-233'44'55'-HeptaCB-(189)	2018/12/31		108	%	30 - 140
			C13-233'44'5-HexaCB-(156)	2018/12/31		98	%	30 - 140
			C13-233'44'5'-HexaCB-(157)	2018/12/31		98	%	30 - 140
			C13-233'44'-PentaCB-(105)	2018/12/31		106	%	30 - 140
			C13-23'44'55'-HexaCB-(167)	2018/12/31		101	%	30 - 140
			C13-2344'5-PentaCB-(114)	2018/12/31		105	%	30 - 140
			C13-23'44'5-PentaCB-(118)	2018/12/31		109	%	30 - 140
			C13-2'344'5-PentaCB-(123)	2018/12/31		109	%	30 - 140
			C13-33'44'55'-HexaCB-(169)	2018/12/31		80	%	30 - 140
			C13-33'44'5-PentaCB-(126)	2018/12/31		104	%	30 - 140
			C13-33'44'-TetraCB-(77)	2018/12/31		99	%	30 - 140
			C13-344'5-TetraCB-(81)	2018/12/31		97	%	30 - 140
			33'44'-TetraCB-(77)	2018/12/31	ND, RDL=0.60		ng	
			344'5-TetraCB-(81)	2018/12/31	ND, RDL=0.60		ng	
			233'44'-PentaCB-(105)	2018/12/31	ND, RDL=0.60		ng	
			2344'5-PentaCB-(114)	2018/12/31	ND, RDL=0.60		ng	
			23'44'5-PentaCB-(118)	2018/12/31	ND, RDL=0.60		ng	
			23'44'5'-PentaCB-(123)	2018/12/31	ND, RDL=0.60		ng	
			33'44'5-PentaCB-(126)	2018/12/31	ND, RDL=0.60		ng	
			HexaCB-(156)+(157)	2018/12/31	ND, RDL=1.2		ng	
			23'44'55'-HexaCB-(167)	2018/12/31	ND, RDL=0.60		ng	
			33'44'55'-HexaCB-(169)	2018/12/31	ND, RDL=0.60		ng	
			233'44'55'-HeptaCB-(189)	2018/12/31	ND, RDL=0.60		ng	
5902066	OBC	Spiked Blank	C13-1234678 HeptaCDD	2018/12/21		82	%	25 - 130
			C13-1234678 HeptaCDF	2018/12/21		80	%	25 - 130
			C13-123678 HexaCDD	2018/12/21		87	%	40 - 130
			C13-123678 HexaCDF	2018/12/21		78	%	40 - 130
			C13-12378 PentaCDD	2018/12/21		87	%	40 - 130
			C13-12378 PentaCDF	2018/12/21		81	%	40 - 130
			C13-123789 HexaCDF	2018/12/21		78	%	40 - 130
			C13-2378 TetraCDD	2018/12/21		98	%	40 - 130
			C13-2378 TetraCDF	2018/12/21		90	%	40 - 130
			C13-Octachlorodibenzo-p-Dioxin	2018/12/21		65	%	25 - 130
			2,3,7,8-Tetra CDD	2018/12/21		96	%	80 - 140
			1,2,3,7,8-Penta CDD	2018/12/21		96	%	80 - 140
			1,2,3,4,7,8-Hexa CDD	2018/12/21		114	%	80 - 140
			1,2,3,6,7,8-Hexa CDD	2018/12/21		102	%	80 - 140
			1,2,3,7,8,9-Hexa CDD	2018/12/21		110	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDD	2018/12/21		97	%	80 - 140

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			1,2,3,4,6,7,8,9-Octa CDD	2018/12/21		100	%	80 - 140
			2,3,7,8-Tetra CDF	2018/12/21		92	%	80 - 140
			1,2,3,7,8-Penta CDF	2018/12/21		102	%	80 - 140
			2,3,4,7,8-Penta CDF	2018/12/21		97	%	80 - 140
			1,2,3,4,7,8-Hexa CDF	2018/12/21		108	%	80 - 140
			1,2,3,6,7,8-Hexa CDF	2018/12/21		105	%	80 - 140
			2,3,4,6,7,8-Hexa CDF	2018/12/21		107	%	80 - 140
			1,2,3,7,8,9-Hexa CDF	2018/12/21		118	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDF	2018/12/21		98	%	80 - 140
			1,2,3,4,7,8,9-Hepta CDF	2018/12/21		97	%	80 - 140
			1,2,3,4,6,7,8,9-Octa CDF	2018/12/21		100	%	80 - 140
5902066	OBC	RPD	2,3,7,8-Tetra CDD	2018/12/21	5.3		%	20
			1,2,3,7,8-Penta CDD	2018/12/21	6.5		%	20
			1,2,3,4,7,8-Hexa CDD	2018/12/21	1.8		%	20
			1,2,3,6,7,8-Hexa CDD	2018/12/21	8.2		%	20
			1,2,3,7,8,9-Hexa CDD	2018/12/21	4.7		%	20
			1,2,3,4,6,7,8-Hepta CDD	2018/12/21	7.5		%	20
			1,2,3,4,6,7,8,9-Octa CDD	2018/12/21	0		%	20
			2,3,7,8-Tetra CDF	2018/12/21	2.2		%	20
			1,2,3,7,8-Penta CDF	2018/12/21	6.1		%	20
			2,3,4,7,8-Penta CDF	2018/12/21	3.1		%	20
			1,2,3,4,7,8-Hexa CDF	2018/12/21	4.7		%	20
			1,2,3,6,7,8-Hexa CDF	2018/12/21	3.9		%	20
			2,3,4,6,7,8-Hexa CDF	2018/12/21	7.8		%	20
			1,2,3,7,8,9-Hexa CDF	2018/12/21	0		%	20
			1,2,3,4,6,7,8-Hepta CDF	2018/12/21	4.2		%	20
			1,2,3,4,7,8,9-Hepta CDF	2018/12/21	0		%	20
			1,2,3,4,6,7,8,9-Octa CDF	2018/12/21	0		%	20
5902066	OBC	Method Blank	C13-1234678 HeptaCDD	2018/12/22		80	%	25 - 130
			C13-1234678 HeptaCDF	2018/12/22		81	%	25 - 130
			C13-123678 HexaCDD	2018/12/22		93	%	40 - 130
			C13-123678 HexaCDF	2018/12/22		86	%	40 - 130
			C13-12378 PentaCDD	2018/12/22		124	%	40 - 130
			C13-12378 PentaCDF	2018/12/22		105	%	40 - 130
			C13-123789 HexaCDF	2018/12/22		82	%	40 - 130
			C13-2378 TetraCDD	2018/12/22		102	%	40 - 130
			C13-2378 TetraCDF	2018/12/22		93	%	40 - 130
			C13-Octachlorodibenzo-p-Dioxin	2018/12/22		67	%	25 - 130
			2,3,7,8-Tetra CDD	2018/12/22	ND, EDL=6.5		pg	
			1,2,3,7,8-Penta CDD	2018/12/22	ND, EDL=6.9		pg	
			1,2,3,4,7,8-Hexa CDD	2018/12/22	ND, EDL=6.3		pg	
			1,2,3,6,7,8-Hexa CDD	2018/12/22	ND, EDL=6.4		pg	
			1,2,3,7,8,9-Hexa CDD	2018/12/22	ND, EDL=5.9		pg	
			1,2,3,4,6,7,8-Hepta CDD	2018/12/22	ND, EDL=6.4		pg	
			1,2,3,4,6,7,8,9-Octa CDD	2018/12/22	ND, EDL=6.0		pg	
			Total Tetra CDD	2018/12/22	ND, EDL=13 (1)		pg	

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			Total Penta CDD	2018/12/22	ND, EDL=6.9		pg	
			Total Hexa CDD	2018/12/22	ND, EDL=22 (1)		pg	
			Total Hepta CDD	2018/12/22	ND, EDL=6.4		pg	
			2,3,7,8-Tetra CDF	2018/12/22	ND, EDL=6.2		pg	
			1,2,3,7,8-Penta CDF	2018/12/22	ND, EDL=6.6		pg	
			2,3,4,7,8-Penta CDF	2018/12/22	ND, EDL=6.6		pg	
			1,2,3,4,7,8-Hexa CDF	2018/12/22	ND, EDL=6.1		pg	
			1,2,3,6,7,8-Hexa CDF	2018/12/22	ND, EDL=6.0		pg	
			2,3,4,6,7,8-Hexa CDF	2018/12/22	ND, EDL=6.4		pg	
			1,2,3,7,8,9-Hexa CDF	2018/12/22	ND, EDL=7.0		pg	
			1,2,3,4,6,7,8-Hepta CDF	2018/12/22	ND, EDL=4.1		pg	
			1,2,3,4,7,8,9-Hepta CDF	2018/12/22	ND, EDL=5.1		pg	
			1,2,3,4,6,7,8,9-Octa CDF	2018/12/22	ND, EDL=6.0		pg	
			Total Tetra CDF	2018/12/22	ND, EDL=9.7 (1)		pg	
			Total Penta CDF	2018/12/22	ND, EDL=6.6		pg	
			Total Hexa CDF	2018/12/22	ND, EDL=6.3		pg	
			Total Hepta CDF	2018/12/22	ND, EDL=4.5		pg	

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Cathy Xu, Scientific Specialist, Ultra Trace Analysis, HRMS

Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

Rodney Major, Manager Organic Processing Lab

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

B8X2103 (SVOC) B8X0884 (M5/M29/CT827/M26/M201A)

Chain of Custody Form - AIR

30742

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Mississauga Ontario, L5N 2L8
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Fax: (905) 817-5777

B8X0018 (VOST)

CAM FCD-01302 /2   Page 9 of 11

ANALYSIS REQUESTED

CLIENT INFORMATION SECTION

Company Name: RWDI
Project Manager:
e-mail:
Address:

Phone: Fax:
Sampled by:

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time	ENV. CANADA PM/2	USEPA M26	U.S. EPA SW846 0030 VOST
SVOC-ALP-T1 (6 SAMPLES)			12/04		✓		
SVOC-ALP-T2			12/05		✓		
SVOC-ALP-T3			12/06		✓		
SVOC-BASELINE-T1			12/07		✓		
SVOC-BASELINE-T2			12/07		✓		
SVOC-BASELINE-T3			12/08		✓		
SVOC-BLANK			[illegible]		✓		
M26-T1-T3-ALP (3 SAMPLES)			12/04-06			✓	
M26-T1-T3-BASELINE (3 SAMPLES)			12/07-08			✓	
VOST-T1-T3-ALP (6 SAMPLES)			12/04-06				✓
VOST-T1-T3-BASELINE (6 SAMPLES)			12/07-08				✓
VOST BLANK			N/A				✓

TAT Requirement

STD 10 Business day ☑
Rush 5 Business day * ☐
Rush 2 Business day * ☐
* need approval from Maxxam

PROJECT INFORMATION

Project #:
Name:
PO #:
Maxxam Quote #:
Maxxam Contact:

REPORTING REQUIREMENTS

Summary Report only ☐
EDD ☐
Regulation

Notes
Please note if this samples are "Industrial Hygiene" samples
If submitting dustfall samples, please indicate the diameter of the jar opening in cm.
PROJECT SPECIFIC COMMENTS

No ice 20.1/20.0/20.1
No ice 19.3/19.9/19.4

Client Signature:
Affiliation:
Date/Time:

Received by: See Page 1
Affiliation:
Date/Time:

COC-1031 (11/2017)

2018/12/10 10:21 5.3/5.7/6.2 °C 12.0/17.7/13.1

Your P.O. #: 1804600
Your Project #: 1804600
Site Location: ST. MARYS
Your C.O.C. #: 32140

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/11/09
Report #: R5478420
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8R2980
Received: 2018/10/15, 15:21

Sample Matrix: Stack Sampling Train
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Chlorobenzenes in MM5 Trains (EPA M0010)	4	2018/10/19	2018/10/29	BRL SOP-00202	In house (M0010)
Chlorophenols in MM5 Trains (EPA M0010)	1	2018/10/19	2018/11/06	BRL SOP-00204	In house (M0010)
Chlorophenols in MM5 Trains (EPA M0010)	3	2018/10/19	2018/11/07	BRL SOP-00204	In house (M0010)
Dioxins/Furans in Air (Method 23)	2	2018/10/19	2018/11/04	BRL SOP-00404	EPA M23/23A m
Dioxins/Furans in Air (Method 23)	2	2018/10/19	2018/11/05	BRL SOP-00404	EPA M23/23A m
PAH's in MM5 SamplingTrains (CARB429mod)	1	2018/10/19	2018/10/31	BRL SOP-00201	CARB429(ARBM1,M2)mod
PAH's in MM5 SamplingTrains (CARB429mod)	3	2018/10/19	2018/11/01	BRL SOP-00201	CARB429(ARBM1,M2)mod
PCBs in a Sampling Train (1668Amod)	4	2018/10/19	2018/11/06	BRL SOP-00408	EPA 1668A m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

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Your P.O. #: 1804600
Your Project #: 1804600
Site Location: ST. MARYS
Your C.O.C. #: 32140

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/11/09
Report #: R5478420
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8R2980
Received: 2018/10/15, 15:21

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B8R2980
Report Date: 2018/11/09

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

RESULTS OF ANALYSES OF STACK SAMPLING TRAIN

Maxxam ID		IAM338							
Sampling Date									
COC Number		32140				TOXIC EQUIVALENCY		# of	
	UNITS	**SVOC BLANK**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
33'44'-TetraCB-(77)	ng	ND	0.038	0.60	N/A	0.00010	0.0000038		5793011
344'5-TetraCB-(81)	ng	ND	0.038	0.60	N/A	0.00030	0.000011		5793011
233'44'-PentaCB-(105)	ng	ND	0.033	0.60	N/A	0.000030	0.00000099		5793011
2344'5-PentaCB-(114)	ng	ND	0.033	0.60	N/A	0.000030	0.00000099		5793011
23'44'5-PentaCB-(118)	ng	0.10	0.032	0.60	N/A	0.000030	0.0000030		5793011
23'44'5'-PentaCB-(123)	ng	ND	0.037	0.60	N/A	0.000030	0.0000011		5793011
33'44'5-PentaCB-(126)	ng	ND	0.031	0.60	N/A	0.10	0.0031		5793011
HexaCB-(156)+(157)	ng	ND	0.041	1.2	N/A	0.000030	0.0000012		5793011
23'44'55'-HexaCB-(167)	ng	ND	0.039	0.60	N/A	0.000030	0.0000012		5793011
33'44'55'-HexaCB-(169)	ng	ND	0.042	0.60	N/A	0.030	0.0013		5793011
233'44'55'-HeptaCB-(189)	ng	ND	0.033	0.60	N/A	0.000030	0.00000099		5793011
TOTAL TOXIC EQUIVALENCY	ng						0.0044		
Surrogate Recovery (%)									
C13-233'44'55'-HeptaCB-(189)	%	107							5793011
C13-233'44'5-HexaCB-(156)	%	93							5793011
C13-233'44'5'-HexaCB-(157)	%	93							5793011
C13-233'44'-PentaCB-(105)	%	106							5793011
C13-23'44'55'-HexaCB-(167)	%	93							5793011
C13-2344'5-PentaCB-(114)	%	97							5793011
C13-23'44'5-PentaCB-(118)	%	108							5793011
C13-2'344'5-PentaCB-(123)	%	105							5793011
C13-33'44'55'-HexaCB-(169)	%	76							5793011
C13-33'44'5-PentaCB-(126)	%	99							5793011
C13-33'44'-TetraCB-(77)	%	92							5793011
C13-344'5-TetraCB-(81)	%	90							5793011

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

ND = Not detected

N/A = Not Applicable

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Maxxam Job #: B8R2980
Report Date: 2018/11/09

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

RESULTS OF ANALYSES OF STACK SAMPLING TRAIN

Maxxam ID		IAM339							
Sampling Date		2018/10/10							
COC Number		32140				TOXIC EQUIVALENCY		# of	
	UNITS	**SVOC T1**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
33'44'-TetraCB-(77)	ng	0.20	0.043	0.60	N/A	0.00010	0.000020		5793011
344'5-TetraCB-(81)	ng	ND	0.042	0.60	N/A	0.00030	0.000013		5793011
233'44'-PentaCB-(105)	ng	0.46	0.040	0.60	N/A	0.000030	0.000014		5793011
2344'5-PentaCB-(114)	ng	0.049	0.040	0.60	N/A	0.000030	0.0000015		5793011
23'44'5-PentaCB-(118)	ng	1.5	0.039	0.60	N/A	0.000030	0.000045		5793011
23'44'5'-PentaCB-(123)	ng	ND (1)	0.053	0.60	N/A	0.000030	0.0000016		5793011
33'44'5-PentaCB-(126)	ng	ND	0.037	0.60	N/A	0.10	0.0037		5793011
HexaCB-(156)+(157)	ng	0.11	0.044	1.2	N/A	0.000030	0.0000033		5793011
23'44'55'-HexaCB-(167)	ng	0.060	0.042	0.60	N/A	0.000030	0.0000018		5793011
33'44'55'-HexaCB-(169)	ng	ND	0.045	0.60	N/A	0.030	0.0014		5793011
233'44'55'-HeptaCB-(189)	ng	ND	0.043	0.60	N/A	0.000030	0.0000013		5793011
TOTAL TOXIC EQUIVALENCY	ng						0.0052		
Surrogate Recovery (%)									
C13-233'44'55'-HeptaCB-(189)	%	104							5793011
C13-233'44'5-HexaCB-(156)	%	75							5793011
C13-233'44'5'-HexaCB-(157)	%	75							5793011
C13-233'44'-PentaCB-(105)	%	85							5793011
C13-23'44'55'-HexaCB-(167)	%	75							5793011
C13-2344'5-PentaCB-(114)	%	83							5793011
C13-23'44'5-PentaCB-(118)	%	88							5793011
C13-2'344'5-PentaCB-(123)	%	84							5793011
C13-33'44'55'-HexaCB-(169)	%	55							5793011
C13-33'44'5-PentaCB-(126)	%	83							5793011
C13-33'44'-TetraCB-(77)	%	128							5793011
C13-344'5-TetraCB-(81)	%	125							5793011

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

N/A = Not Applicable

ND = Not detected

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B8R2980
Report Date: 2018/11/09

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

RESULTS OF ANALYSES OF STACK SAMPLING TRAIN

Maxxam ID		IAM340							
Sampling Date		2018/10/12							
COC Number		32140				**TOXIC EQUIVALENCY**		# of	
	UNITS	**SVOC T2**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
33'44'-TetraCB-(77)	ng	0.096	0.082	0.60	N/A	0.00010	0.0000096		5793011
344'5-TetraCB-(81)	ng	ND	0.081	0.60	N/A	0.00030	0.000024		5793011
233'44'-PentaCB-(105)	ng	0.17	0.043	0.60	N/A	0.000030	0.0000051		5793011
2344'5-PentaCB-(114)	ng	ND	0.043	0.60	N/A	0.000030	0.0000013		5793011
23'44'5-PentaCB-(118)	ng	0.60	0.042	0.60	N/A	0.000030	0.000018		5793011
23'44'5'-PentaCB-(123)	ng	ND	0.048	0.60	N/A	0.000030	0.0000014		5793011
33'44'5-PentaCB-(126)	ng	ND	0.041	0.60	N/A	0.10	0.0041		5793011
HexaCB-(156)+(157)	ng	ND	0.050	1.2	N/A	0.000030	0.0000015		5793011
23'44'55'-HexaCB-(167)	ng	ND	0.048	0.60	N/A	0.000030	0.0000014		5793011
33'44'55'-HexaCB-(169)	ng	ND	0.051	0.60	N/A	0.030	0.0015		5793011
233'44'55'-HeptaCB-(189)	ng	ND	0.036	0.60	N/A	0.000030	0.0000011		5793011
TOTAL TOXIC EQUIVALENCY	ng						0.0057		
Surrogate Recovery (%)									
C13-233'44'55'-HeptaCB-(189)	%	99							5793011
C13-233'44'5-HexaCB-(156)	%	68							5793011
C13-233'44'5'-HexaCB-(157)	%	68							5793011
C13-233'44'-PentaCB-(105)	%	75							5793011
C13-23'44'55'-HexaCB-(167)	%	70							5793011
C13-2344'5-PentaCB-(114)	%	70							5793011
C13-23'44'5-PentaCB-(118)	%	76							5793011
C13-2'344'5-PentaCB-(123)	%	73							5793011
C13-33'44'55'-HexaCB-(169)	%	49							5793011
C13-33'44'5-PentaCB-(126)	%	70							5793011
C13-33'44'-TetraCB-(77)	%	107							5793011
C13-344'5-TetraCB-(81)	%	102							5793011

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

N/A = Not Applicable

ND = Not detected

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Maxxam
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Maxxam Job #: B8R2980
Report Date: 2018/11/09

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

RESULTS OF ANALYSES OF STACK SAMPLING TRAIN

Maxxam ID		IAM358							
Sampling Date		2018/10/12							
COC Number		32140				**TOXIC EQUIVALENCY**		# of	
	UNITS	**SVOC T3**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
33'44'-TetraCB-(77)	ng	ND	0.083	0.60	N/A	0.00010	0.0000083		5793011
344'5-TetraCB-(81)	ng	ND	0.082	0.60	N/A	0.00030	0.000025		5793011
233'44'-PentaCB-(105)	ng	0.14	0.054	0.60	N/A	0.000030	0.0000042		5793011
2344'5-PentaCB-(114)	ng	ND	0.054	0.60	N/A	0.000030	0.0000016		5793011
23'44'5-PentaCB-(118)	ng	0.45	0.053	0.60	N/A	0.000030	0.000014		5793011
23'44'5'-PentaCB-(123)	ng	ND	0.060	0.60	N/A	0.000030	0.0000018		5793011
33'44'5-PentaCB-(126)	ng	ND	0.051	0.60	N/A	0.10	0.0051		5793011
HexaCB-(156)+(157)	ng	ND	0.075	1.2	N/A	0.000030	0.0000023		5793011
23'44'55'-HexaCB-(167)	ng	ND	0.071	0.60	N/A	0.000030	0.0000021		5793011
33'44'55'-HexaCB-(169)	ng	ND	0.076	0.60	N/A	0.030	0.0023		5793011
233'44'55'-HeptaCB-(189)	ng	ND	0.040	0.60	N/A	0.000030	0.0000012		5793011
TOTAL TOXIC EQUIVALENCY	ng						0.0075		
Surrogate Recovery (%)									
C13-233'44'55'-HeptaCB-(189)	%	99							5793011
C13-233'44'5-HexaCB-(156)	%	68							5793011
C13-233'44'5'-HexaCB-(157)	%	68							5793011
C13-233'44'-PentaCB-(105)	%	72							5793011
C13-23'44'55'-HexaCB-(167)	%	68							5793011
C13-2344'5-PentaCB-(114)	%	69							5793011
C13-23'44'5-PentaCB-(118)	%	74							5793011
C13-2'344'5-PentaCB-(123)	%	71							5793011
C13-33'44'55'-HexaCB-(169)	%	50							5793011
C13-33'44'5-PentaCB-(126)	%	70							5793011
C13-33'44'-TetraCB-(77)	%	99							5793011
C13-344'5-TetraCB-(81)	%	94							5793011

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

ND = Not detected

N/A = Not Applicable

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Maxxam Job #: B8R2980
Report Date: 2018/11/09

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

SEMI-VOLATILE ORGANICS BY GC-MS (STACK SAMPLING TRAIN)

Maxxam ID		IAM338			IAM339			IAM340	IAM358			
Sampling Date					2018/10/10			2018/10/12	2018/10/12			
COC Number		32140			32140			32140	32140			
	UNITS	SVOC BLANK	RDL	MDL	SVOC T1	RDL	MDL	SVOC T2	SVOC T3	RDL	MDL	QC Batch
1-Methylnaphthalene	ug	ND	0.30	0.30	379	6.0	6.0	316	326	6.0	6.0	5792973
1-Methylphenanthrene	ug	ND	0.30	0.30	8.10	0.30	0.30	3.36	2.64	0.30	0.30	5792973
2-Chloronaphthalene	ug	ND	0.30	0.30	8.70	0.30	0.30	6.30	5.94	0.30	0.30	5792973
2-Methylanthracene	ug	ND	0.30	0.30	ND	0.30	0.30	ND	ND	0.30	0.30	5792973
2-Methylnaphthalene	ug	ND	0.30	0.060	551	6.0	1.2	461	475	6.0	1.2	5792973
3-Methylcholanthrene	ug	ND	0.30	0.30	ND	0.30	0.30	ND	ND	0.30	0.30	5792973
7,12-Dimethylbenzo(a)anthracene	ug	ND	1.2	0.30	ND	1.2	0.30	ND	ND	1.2	0.30	5792973
9,10-Dimethylanthracene	ug	ND	0.30	0.30	ND	0.30	0.30	ND	ND	0.30	0.30	5792973
9-Methylphenanthrene	ug	ND	0.30	N/A	18.4	0.30	N/A	8.58	6.60	0.30	N/A	5792973
Acenaphthene	ug	ND	0.30	0.060	9.30	0.30	0.060	7.38	7.32	0.30	0.060	5792973
Acenaphthylene	ug	ND	0.30	0.060	16.7	0.30	0.060	10.7	8.94	0.30	0.060	5792973
Anthracene	ug	ND	0.30	0.060	2.10	0.30	0.060	1.02	1.14	0.30	0.060	5792973
Benzo(a)anthracene	ug	ND	0.30	0.060	ND	0.30	0.060	ND	ND	0.30	0.060	5792973
Benzo(a)fluorene	ug	ND	0.30	0.30	ND	0.30	0.30	ND	ND	0.30	0.30	5792973
Benzo(a)pyrene	ug	ND	0.30	0.060	ND	0.30	0.060	ND	ND	0.30	0.060	5792973
Benzo(b)fluoranthene	ug	ND	0.30	0.060	ND	0.30	0.060	ND	ND	0.30	0.060	5792973
Benzo(b)fluorene	ug	ND	0.30	0.30	ND	0.30	0.30	ND	ND	0.30	0.30	5792973
Benzo(e)pyrene	ug	ND	0.30	0.30	ND	0.30	0.30	ND	ND	0.30	0.30	5792973
Benzo(g,h,i)perylene	ug	ND	0.30	0.060	ND	0.30	0.060	ND	ND	0.30	0.060	5792973
Benzo(k)fluoranthene	ug	ND	0.30	0.060	ND	0.30	0.060	ND	ND	0.30	0.060	5792973
Chrysene	ug	ND	0.30	0.060	ND	0.30	0.060	ND	ND	0.30	0.060	5792973
Coronene	ug	ND	0.30	0.30	ND	0.30	0.30	ND	ND	0.30	0.30	5792973
Dibenzo(a,c)anthracene	ug	ND	0.30	0.060	ND	0.30	0.060	ND	ND	0.30	0.060	5792973
Fluoranthene	ug	ND	0.30	0.060	1.14	0.30	0.060	0.36	0.30	0.30	0.060	5792973
Fluorene	ug	ND	0.30	0.060	10.4	0.30	0.060	7.56	5.88	0.30	0.060	5792973
Indeno(1,2,3-cd)pyrene	ug	ND	0.30	0.060	ND	0.30	0.060	ND	ND	0.30	0.060	5792973
Naphthalene	ug	ND	0.30	0.30	718	6.0	6.0	620	641	6.0	6.0	5792973
Perylene	ug	ND	0.30	0.30	ND	0.30	0.30	ND	ND	0.30	0.30	5792973
Phenanthrene	ug	ND	0.30	0.060	74.1	6.0	1.2	36.1	28.4	0.30	0.060	5792973
Picene	ug	ND	0.30	0.060	ND	0.30	0.060	ND	ND	0.30	0.060	5792973
Pyrene	ug	ND	0.30	0.060	0.54	0.30	0.060	ND	ND	0.30	0.060	5792973
Tetralin	ug	ND	0.30	0.30	175	6.0	6.0	173	176	6.0	6.0	5792973
Triphenylene	ug	ND	0.30	0.060	ND	0.30	0.060	ND	ND	0.30	0.060	5792973
1,2,3,4-Tetrachlorobenzene	ug	ND	0.30	0.060	ND	0.30	0.060	ND	ND	0.30	0.060	5792998

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

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Maxxam Job #: B8R2980
Report Date: 2018/11/09

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

SEMI-VOLATILE ORGANICS BY GC-MS (STACK SAMPLING TRAIN)

Maxxam ID		IAM338			IAM339			IAM340	IAM358			
Sampling Date					2018/10/10			2018/10/12	2018/10/12			
COC Number		32140			32140			32140	32140			
	UNITS	**SVOC BLANK**	**RDL**	**MDL**	**SVOC T1**	**RDL**	**MDL**	**SVOC T2**	**SVOC T3**	**RDL**	**MDL**	**QC Batch**
1,2,3,5+1,2,4,5-Tetrachlorobenzene	ug	ND	0.30	0.060	ND	0.30	0.060	ND	ND	0.30	0.060	5792998
1,2,3-Trichlorobenzene	ug	ND	0.30	0.060	5.34	0.30	0.060	4.69	0.88	0.30	0.060	5792998
1,2,4-Trichlorobenzene	ug	ND	0.30	0.060	2.59	0.30	0.060	2.94	2.18	0.30	0.060	5792998
1,2-Dichlorobenzene	ug	ND	0.30	0.060	7.62	0.30	0.060	5.90	5.66	0.30	0.060	5792998
1,3,5-Trichlorobenzene	ug	ND	0.30	0.060	ND	0.30	0.060	ND	0.31	0.30	0.060	5792998
1,3-Dichlorobenzene	ug	ND	0.30	0.060	3.40	0.30	0.060	3.01	2.40	0.30	0.060	5792998
1,4-Dichlorobenzene	ug	ND	0.30	0.060	2.29	0.30	0.060	2.01	2.28	0.30	0.060	5792998
Hexachlorobenzene	ug	ND	0.30	0.060	ND	0.30	0.060	ND	ND	0.30	0.060	5792998
Pentachlorobenzene	ug	ND	0.30	0.060	ND	0.30	0.060	ND	ND	0.30	0.060	5792998
2,3,4,5-Tetrachlorophenol	ug	ND	0.30	0.24	ND	0.30	0.24	ND	ND	0.30	0.24	5793003
2,3,4,6-Tetrachlorophenol	ug	ND	0.30	0.24	ND	0.30	0.24	ND	ND	0.30	0.24	5793003
2,3,4-Trichlorophenol	ug	ND	0.30	0.24	ND	0.30	0.24	ND	ND	0.30	0.24	5793003
2,3,5,6-Tetrachlorophenol	ug	ND	0.30	0.24	ND	0.30	0.24	ND	ND	0.30	0.24	5793003
2,3,5-Trichlorophenol	ug	ND	0.30	0.24	ND	0.30	0.24	ND	ND	0.30	0.24	5793003
2,3,6-Trichlorophenol	ug	ND	0.30	0.24	ND	0.30	0.24	ND	ND	0.30	0.24	5793003
2,3-Dichlorophenol	ug	ND	0.30	0.24	0.31	0.30	0.24	0.30	ND	0.30	0.24	5793003
2,4 + 2,5-Dichlorophenol	ug	ND	0.30	0.24	0.74	0.30	0.24	0.67	0.62	0.30	0.24	5793003
2,4,5-Trichlorophenol	ug	ND	0.30	0.24	ND	0.30	0.24	ND	ND	0.30	0.24	5793003
2,4,6-Trichlorophenol	ug	ND	0.30	0.24	ND	0.30	0.24	ND	ND	0.30	0.24	5793003
2,6-Dichlorophenol	ug	ND	0.30	0.24	0.34	0.30	0.24	0.30	ND	0.30	0.24	5793003
2-Chlorophenol	ug	ND	0.30	0.24	19.3	0.30	0.24	17.6	15.1	0.30	0.24	5793003
3,4,5-Trichlorophenol	ug	ND	0.30	0.24	ND	0.30	0.24	ND	ND	0.30	0.24	5793003
3,4-Dichlorophenol	ug	ND	0.30	0.24	ND	0.30	0.24	ND	ND	0.30	0.24	5793003
3,5-Dichlorophenol	ug	ND	0.30	0.24	ND	0.30	0.24	ND	ND	0.30	0.24	5793003
3-Chlorophenol	ug	ND	0.30	0.24	4.46	0.30	0.24	3.94	3.77	0.30	0.24	5793003
4-Chlorophenol	ug	ND	0.30	0.24	4.10	0.30	0.24	3.82	3.75	0.30	0.24	5793003
Pentachlorophenol	ug	ND	0.30	0.24	ND	0.30	0.24	ND	ND	0.30	0.24	5793003
Surrogate Recovery (%)												
13C6-Hexachlorobenzene	%	86			93			95	91			5792998
2H3-1,2,3-Trichlorobenzene (FS)	%	85			105			102	87			5792998
2H3-1,2,4-Trichlorobenzene	%	91			90			87	84			5792998
2H4-1,3-Dichlorobenzene	%	63			126			119	100			5792998
2H4-1,4-Dichlorobenzene (FS)	%	101			118			107	107			5792998
2,6-Dibromo-4-fluorophenol (FS)	%	91			91			97	101			5793003

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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SEMI-VOLATILE ORGANICS BY GC-MS (STACK SAMPLING TRAIN)

Maxxam ID		IAM338			IAM339			IAM340	IAM358			
Sampling Date					2018/10/10			2018/10/12	2018/10/12			
COC Number		32140			32140			32140	32140			
	UNITS	**SVOC BLANK**	**RDL**	**MDL**	**SVOC T1**	**RDL**	**MDL**	**SVOC T2**	**SVOC T3**	**RDL**	**MDL**	**QC Batch**
D3-2,4-Dichlorophenol	%	94			98			101	104			5793003
D6-Pentachlorophenol	%	137 (1)			139 (1)			141 (1)	186 (1)			5793003
D10-2-Methylnaphthalene	%	86			196 (2)			172 (2)	146			5792973
D10-Anthracene	%	86			76			72	68			5792973
D10-Fluoranthene	%	86			118			90	96			5792973
D10-Fluorene (FS)	%	84			88			74	72			5792973
D10-Phenanthrene	%	86			110			86	82			5792973
D12-Benzo(a)anthracene	%	98			110			114	110			5792973
D12-Benzo(a)pyrene	%	56			104			98	100			5792973
D12-Benzo(b)fluoranthene	%	106			108			108	112			5792973
D12-Benzo(ghi)perylene	%	108			108			114	110			5792973
D12-Benzo(k)fluoranthene	%	102			96			104	100			5792973
D12-Chrysene	%	104			100			110	98			5792973
D12-Indeno(1,2,3-cd)pyrene	%	106			108			112	108			5792973
D12-Perylene	%	68			98			98	100			5792973
D14-Dibenzo(a,h)anthracene	%	106			110			114	110			5792973
D14-Terphenyl (FS)	%	84			124			90	100			5792973
D8-Acenaphthylene	%	82			112			108	100			5792973
D8-Naphthalene	%	84			120 (3)			126	118			5792973

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) Surrogate recovery was above the upper control limit due to matrix interference. This may represent a high bias in some results.

(3) D8-Naphthalene reported from 20 x dilution.

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Maxxam Job #: B8R2980
Report Date: 2018/11/09

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (STACK SAMPLING TRAIN)

Maxxam ID		IAM338							
Sampling Date									
COC Number		32140				TOXIC EQUIVALENCY		# of	
	UNITS	SVOC BLANK	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	ND	16	60	12	1.00	16.0		5819589
1,2,3,7,8-Penta CDD *	pg	ND	9.0	60	12	1.00	9.00		5819589
1,2,3,4,7,8-Hexa CDD *	pg	ND	6.6	60	12	0.100	0.660		5819589
1,2,3,6,7,8-Hexa CDD *	pg	ND	6.4	60	12	0.100	0.640		5819589
1,2,3,7,8,9-Hexa CDD *	pg	ND	6.0	60	12	0.100	0.600		5819589
1,2,3,4,6,7,8-Hepta CDD *	pg	ND	6.5	60	18	0.0100	0.0650		5819589
1,2,3,4,6,7,8,9-Octa CDD *	pg	19.4	6.9	600	18	0.000300	0.00582		5819589
Total Tetra CDD *	pg	ND (1)	80	60	N/A			0	5819589
Total Penta CDD *	pg	ND (1)	68	60	N/A			0	5819589
Total Hexa CDD *	pg	ND (1)	160	60	N/A			0	5819589
Total Hepta CDD *	pg	ND	6.5	60	N/A			0	5819589
2,3,7,8-Tetra CDF **	pg	ND	7.7	60	12	0.100	0.770		5819589
1,2,3,7,8-Penta CDF **	pg	ND	6.5	60	12	0.0300	0.195		5819589
2,3,4,7,8-Penta CDF **	pg	ND	6.6	60	12	0.300	1.98		5819589
1,2,3,4,7,8-Hexa CDF **	pg	ND	6.1	60	12	0.100	0.610		5819589
1,2,3,6,7,8-Hexa CDF **	pg	ND	6.0	60	12	0.100	0.600		5819589
2,3,4,6,7,8-Hexa CDF **	pg	ND	6.6	60	12	0.100	0.660		5819589
1,2,3,7,8,9-Hexa CDF **	pg	ND	7.5	60	12	0.100	0.750		5819589
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	5.9	60	18	0.0100	0.0590		5819589
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	7.6	60	12	0.0100	0.0760		5819589
1,2,3,4,6,7,8,9-Octa CDF **	pg	11.9	7.2	600	30	0.000300	0.00357		5819589
Total Tetra CDF **	pg	ND (1)	8.8	60	N/A			0	5819589
Total Penta CDF **	pg	ND	6.6	60	N/A			0	5819589
Total Hexa CDF **	pg	ND	6.5	60	N/A			0	5819589
Total Hepta CDF **	pg	ND	6.6	60	N/A			0	5819589
TOTAL TOXIC EQUIVALENCY	pg						32.7		

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

ND = Not detected

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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Maxxam Job #: B8R2980
Report Date: 2018/11/09

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (STACK SAMPLING TRAIN)

Maxxam ID		IAM338							
Sampling Date									
COC Number		32140				TOXIC EQUIVALENCY		# of	
	UNITS	SVOC BLANK	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	90							5819589
C13-1234678 HeptaCDF **	%	78							5819589
C13-123478 HexaCDD *	%	114							5819589
C13-123478 HexaCDF **	%	102							5819589
C13-1234789 HeptaCDF **	%	114							5819589
C13-123678 HexaCDD *	%	93							5819589
C13-123678 HexaCDF **	%	80							5819589
C13-12378 PentaCDD *	%	89							5819589
C13-12378 PentaCDF **	%	75							5819589
C13-123789 HexaCDF **	%	78							5819589
C13-23478 PentaCDF **	%	114							5819589
C13-2378 TetraCDD *	%	106							5819589
C13-2378 TetraCDF **	%	77							5819589
C13-Octachlorodibenzo-p-Dioxin	%	111							5819589
Cl37-2378 TetraCDD *	%	85							5819589

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8R2980
Report Date: 2018/11/09

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (STACK SAMPLING TRAIN)

Maxxam ID		IAM339							
Sampling Date		2018/10/10							
COC Number		32140				TOXIC EQUIVALENCY		# of	
	UNITS	SVOC T1	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	ND	18	60	12	1.00	18.0		5819589
1,2,3,7,8-Penta CDD *	pg	ND	10	60	12	1.00	10.0		5819589
1,2,3,4,7,8-Hexa CDD *	pg	ND	6.9	60	12	0.100	0.690		5819589
1,2,3,6,7,8-Hexa CDD *	pg	ND	6.7	60	12	0.100	0.670		5819589
1,2,3,7,8,9-Hexa CDD *	pg	ND	6.3	60	12	0.100	0.630		5819589
1,2,3,4,6,7,8-Hepta CDD *	pg	ND	6.3	60	18	0.0100	0.0630		5819589
1,2,3,4,6,7,8,9-Octa CDD *	pg	14.9	6.8	600	18	0.000300	0.00447		5819589
Total Tetra CDD *	pg	ND (1)	70	60	N/A			0	5819589
Total Penta CDD *	pg	ND (1)	64	60	N/A			0	5819589
Total Hexa CDD *	pg	ND (1)	180	60	N/A			0	5819589
Total Hepta CDD *	pg	ND	6.3	60	N/A			0	5819589
2,3,7,8-Tetra CDF **	pg	30	13	60	12	0.100	3.00		5819589
1,2,3,7,8-Penta CDF **	pg	ND	6.6	60	12	0.0300	0.198		5819589
2,3,4,7,8-Penta CDF **	pg	ND	6.7	60	12	0.300	2.01		5819589
1,2,3,4,7,8-Hexa CDF **	pg	ND	6.2	60	12	0.100	0.620		5819589
1,2,3,6,7,8-Hexa CDF **	pg	ND	6.1	60	12	0.100	0.610		5819589
2,3,4,6,7,8-Hexa CDF **	pg	ND	6.7	60	12	0.100	0.670		5819589
1,2,3,7,8,9-Hexa CDF **	pg	ND	7.6	60	12	0.100	0.760		5819589
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	6.1	60	18	0.0100	0.0610		5819589
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	8.0	60	12	0.0100	0.0800		5819589
1,2,3,4,6,7,8,9-Octa CDF **	pg	ND	6.3	600	30	0.000300	0.00189		5819589
Total Tetra CDF **	pg	127	13	60	N/A			4	5819589
Total Penta CDF **	pg	ND	6.7	60	N/A			0	5819589
Total Hexa CDF **	pg	ND	6.6	60	N/A			0	5819589
Total Hepta CDF **	pg	ND	7.0	60	N/A			0	5819589
TOTAL TOXIC EQUIVALENCY	pg						38.1		

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

ND = Not detected

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B8R2980
Report Date: 2018/11/09

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (STACK SAMPLING TRAIN)

Maxxam ID		IAM339							
Sampling Date		2018/10/10							
COC Number		32140				**TOXIC EQUIVALENCY**		# of	
	UNITS	**SVOC T1**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	103							5819589
C13-1234678 HeptaCDF **	%	82							5819589
C13-123478 HexaCDD *	%	95							5819589
C13-123478 HexaCDF **	%	88							5819589
C13-1234789 HeptaCDF **	%	105							5819589
C13-123678 HexaCDD *	%	99							5819589
C13-123678 HexaCDF **	%	89							5819589
C13-12378 PentaCDD *	%	99							5819589
C13-12378 PentaCDF **	%	84							5819589
C13-123789 HexaCDF **	%	77							5819589
C13-23478 PentaCDF **	%	111							5819589
C13-2378 TetraCDD *	%	114							5819589
C13-2378 TetraCDF **	%	73							5819589
C13-Octachlorodibenzo-p-Dioxin	%	110							5819589
Cl37-2378 TetraCDD *	%	74							5819589

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B8R2980
Report Date: 2018/11/09

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (STACK SAMPLING TRAIN)

Maxxam ID		IAM340							
Sampling Date		2018/10/12							
COC Number		32140				**TOXIC EQUIVALENCY**		# of	
	UNITS	**SVOC T2**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	ND	16	60	12	1.00	16.0		5819589
1,2,3,7,8-Penta CDD *	pg	ND	8.0	60	12	1.00	8.00		5819589
1,2,3,4,7,8-Hexa CDD *	pg	ND	6.6	60	12	0.100	0.660		5819589
1,2,3,6,7,8-Hexa CDD *	pg	ND	6.5	60	12	0.100	0.650		5819589
1,2,3,7,8,9-Hexa CDD *	pg	ND	6.1	60	12	0.100	0.610		5819589
1,2,3,4,6,7,8-Hepta CDD *	pg	ND	6.6	60	18	0.0100	0.0660		5819589
1,2,3,4,6,7,8,9-Octa CDD *	pg	7.4 (1)	6.5	600	18	0.000300	0.00222		5819589
Total Tetra CDD *	pg	ND (2)	83	60	N/A			0	5819589
Total Penta CDD *	pg	ND (2)	56	60	N/A			0	5819589
Total Hexa CDD *	pg	ND (2)	160	60	N/A			0	5819589
Total Hepta CDD *	pg	ND	6.6	60	N/A			0	5819589
2,3,7,8-Tetra CDF **	pg	ND	15	60	12	0.100	1.50		5819589
1,2,3,7,8-Penta CDF **	pg	ND	6.9	60	12	0.0300	0.207		5819589
2,3,4,7,8-Penta CDF **	pg	ND	6.9	60	12	0.300	2.07		5819589
1,2,3,4,7,8-Hexa CDF **	pg	ND	9.6	60	12	0.100	0.960		5819589
1,2,3,6,7,8-Hexa CDF **	pg	ND	9.4	60	12	0.100	0.940		5819589
2,3,4,6,7,8-Hexa CDF **	pg	ND	10	60	12	0.100	1.00		5819589
1,2,3,7,8,9-Hexa CDF **	pg	ND	12	60	12	0.100	1.20		5819589
1,2,3,4,6,7,8-Hepta CDF **	pg	9.2	5.9	60	18	0.0100	0.0920		5819589
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	7.7	60	12	0.0100	0.0770		5819589
1,2,3,4,6,7,8,9-Octa CDF **	pg	9.6	7.0	600	30	0.000300	0.00288		5819589
Total Tetra CDF **	pg	ND	15	60	N/A			0	5819589
Total Penta CDF **	pg	ND	6.9	60	N/A			0	5819589
Total Hexa CDF **	pg	ND	10	60	N/A			0	5819589
Total Hepta CDF **	pg	9.2	6.6	60	N/A			1	5819589

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan
(1) EMPC / Ratio - Isotopic ratio adjusted to meet theoretical
(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B8R2980
Report Date: 2018/11/09

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (STACK SAMPLING TRAIN)

Maxxam ID		IAM340							
Sampling Date		2018/10/12							
COC Number		32140				**TOXIC EQUIVALENCY**		# of	
	UNITS	**SVOC T2**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
TOTAL TOXIC EQUIVALENCY	pg						34.0		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	80							5819589
C13-1234678 HeptaCDF **	%	72							5819589
C13-123478 HexaCDD *	%	94							5819589
C13-123478 HexaCDF **	%	91							5819589
C13-1234789 HeptaCDF **	%	103							5819589
C13-123678 HexaCDD *	%	87							5819589
C13-123678 HexaCDF **	%	74							5819589
C13-12378 PentaCDD *	%	84							5819589
C13-12378 PentaCDF **	%	70							5819589
C13-123789 HexaCDF **	%	68							5819589
C13-23478 PentaCDF **	%	108							5819589
C13-2378 TetraCDD *	%	101							5819589
C13-2378 TetraCDF **	%	67							5819589
C13-Octachlorodibenzo-p-Dioxin	%	92							5819589
Cl37-2378 TetraCDD *	%	83							5819589

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8R2980
Report Date: 2018/11/09

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (STACK SAMPLING TRAIN)

Maxxam ID		IAM358							
Sampling Date		2018/10/12							
COC Number		32140				TOXIC EQUIVALENCY		# of	
	UNITS	SVOC T3	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	ND	15	60	12	1.00	15.0		5819589
1,2,3,7,8-Penta CDD *	pg	ND	13	60	12	1.00	13.0		5819589
1,2,3,4,7,8-Hexa CDD *	pg	ND	6.7	60	12	0.100	0.670		5819589
1,2,3,6,7,8-Hexa CDD *	pg	ND	6.6	60	12	0.100	0.660		5819589
1,2,3,7,8,9-Hexa CDD *	pg	ND	6.2	60	12	0.100	0.620		5819589
1,2,3,4,6,7,8-Hepta CDD *	pg	ND	6.9	60	18	0.0100	0.0690		5819589
1,2,3,4,6,7,8,9-Octa CDD *	pg	10.4	6.5	600	18	0.000300	0.00312		5819589
Total Tetra CDD *	pg	ND (1)	71	60	N/A			0	5819589
Total Penta CDD *	pg	ND (1)	64	60	N/A			0	5819589
Total Hexa CDD *	pg	ND (1)	170	60	N/A			0	5819589
Total Hepta CDD *	pg	ND	6.9	60	N/A			0	5819589
2,3,7,8-Tetra CDF **	pg	ND	12	60	12	0.100	1.20		5819589
1,2,3,7,8-Penta CDF **	pg	ND	7.0	60	12	0.0300	0.210		5819589
2,3,4,7,8-Penta CDF **	pg	ND	7.1	60	12	0.300	2.13		5819589
1,2,3,4,7,8-Hexa CDF **	pg	ND	7.0	60	12	0.100	0.700		5819589
1,2,3,6,7,8-Hexa CDF **	pg	ND	6.9	60	12	0.100	0.690		5819589
2,3,4,6,7,8-Hexa CDF **	pg	ND	7.6	60	12	0.100	0.760		5819589
1,2,3,7,8,9-Hexa CDF **	pg	ND	8.7	60	12	0.100	0.870		5819589
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	6.1	60	18	0.0100	0.0610		5819589
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	8.0	60	12	0.0100	0.0800		5819589
1,2,3,4,6,7,8,9-Octa CDF **	pg	ND	6.3	600	30	0.000300	0.00189		5819589
Total Tetra CDF **	pg	ND	12	60	N/A			0	5819589
Total Penta CDF **	pg	ND	7.0	60	N/A			0	5819589
Total Hexa CDF **	pg	ND	7.5	60	N/A			0	5819589
Total Hepta CDF **	pg	ND	6.9	60	N/A			0	5819589
TOTAL TOXIC EQUIVALENCY	pg						36.7		

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

ND = Not detected

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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Maxxam Job #: B8R2980
Report Date: 2018/11/09

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (STACK SAMPLING TRAIN)

Maxxam ID		IAM358							
Sampling Date		2018/10/12							
COC Number		32140				**TOXIC EQUIVALENCY**		# of	
	UNITS	**SVOC T3**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	87							5819589
C13-1234678 HeptaCDF **	%	75							5819589
C13-123478 HexaCDD *	%	101							5819589
C13-123478 HexaCDF **	%	96							5819589
C13-1234789 HeptaCDF **	%	107							5819589
C13-123678 HexaCDD *	%	89							5819589
C13-123678 HexaCDF **	%	77							5819589
C13-12378 PentaCDD *	%	76							5819589
C13-12378 PentaCDF **	%	67							5819589
C13-123789 HexaCDF **	%	75							5819589
C13-23478 PentaCDF **	%	101							5819589
C13-2378 TetraCDD *	%	108							5819589
C13-2378 TetraCDF **	%	76							5819589
C13-Octachlorodibenzo-p-Dioxin	%	107							5819589
Cl37-2378 TetraCDD *	%	83							5819589

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B8R2980
Report Date: 2018/11/09

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

TEST SUMMARY

Maxxam ID: IAM338
Sample ID: SVOC BLANK
Matrix: Stack Sampling Train

Collected:
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chlorobenzenes in MM5 Trains (EPA M0010)	GC/MS	5792998	2018/10/19	2018/10/29	Fan (Carrie) Jiang
Chlorophenols in MM5 Trains (EPA M0010)	GC/MS	5793003	2018/10/19	2018/11/06	Fan (Carrie) Jiang
Dioxins/Furans in Air (Method 23)	HRMS/MS	5819589	2018/10/19	2018/11/04	Owen Cosby
PAH's in MM5 SamplingTrains (CARB429mod)	GC/MS	5792973	2018/10/19	2018/10/31	Fan (Carrie) Jiang
PCBs in a Sampling Train (1668Amod)	HRMS/MS	5793011	2018/10/19	2018/11/06	Cathy Xu

Maxxam ID: IAM339
Sample ID: SVOC T1
Matrix: Stack Sampling Train

Collected: 2018/10/10
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chlorobenzenes in MM5 Trains (EPA M0010)	GC/MS	5792998	2018/10/19	2018/10/29	Fan (Carrie) Jiang
Chlorophenols in MM5 Trains (EPA M0010)	GC/MS	5793003	2018/10/19	2018/11/07	Fan (Carrie) Jiang
Dioxins/Furans in Air (Method 23)	HRMS/MS	5819589	2018/10/19	2018/11/04	Owen Cosby
PAH's in MM5 SamplingTrains (CARB429mod)	GC/MS	5792973	2018/10/19	2018/11/01	Fan (Carrie) Jiang
PCBs in a Sampling Train (1668Amod)	HRMS/MS	5793011	2018/10/19	2018/11/06	Cathy Xu

Maxxam ID: IAM340
Sample ID: SVOC T2
Matrix: Stack Sampling Train

Collected: 2018/10/12
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chlorobenzenes in MM5 Trains (EPA M0010)	GC/MS	5792998	2018/10/19	2018/10/29	Fan (Carrie) Jiang
Chlorophenols in MM5 Trains (EPA M0010)	GC/MS	5793003	2018/10/19	2018/11/07	Fan (Carrie) Jiang
Dioxins/Furans in Air (Method 23)	HRMS/MS	5819589	2018/10/19	2018/11/05	Owen Cosby
PAH's in MM5 SamplingTrains (CARB429mod)	GC/MS	5792973	2018/10/19	2018/11/01	Fan (Carrie) Jiang
PCBs in a Sampling Train (1668Amod)	HRMS/MS	5793011	2018/10/19	2018/11/06	Cathy Xu

Maxxam ID: IAM358
Sample ID: SVOC T3
Matrix: Stack Sampling Train

Collected: 2018/10/12
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chlorobenzenes in MM5 Trains (EPA M0010)	GC/MS	5792998	2018/10/19	2018/10/29	Fan (Carrie) Jiang
Chlorophenols in MM5 Trains (EPA M0010)	GC/MS	5793003	2018/10/19	2018/11/07	Fan (Carrie) Jiang
Dioxins/Furans in Air (Method 23)	HRMS/MS	5819589	2018/10/19	2018/11/05	Owen Cosby
PAH's in MM5 SamplingTrains (CARB429mod)	GC/MS	5792973	2018/10/19	2018/11/01	Fan (Carrie) Jiang
PCBs in a Sampling Train (1668Amod)	HRMS/MS	5793011	2018/10/19	2018/11/06	Cathy Xu

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GENERAL COMMENTS

Sample IAM339 [SVOC T1] : PAH Analysis: Due to high concentrations of some of the target analytes, sample required dilution. Detection limits for those compounds were adjusted accordingly.

Sample IAM340 [SVOC T2] : PAH Analysis: Due to high concentrations of some of the target analytes, sample required dilution. Detection limits for those compounds were adjusted accordingly.

Sample IAM358 [SVOC T3] : PAH Analysis: Due to high concentrations of some of the target analytes, sample required dilution. Detection limits for those compounds were adjusted accordingly.

Results relate only to the items tested.

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Maxxam Job #: B8R2980
Report Date: 2018/11/09

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5792973	FJI	Spiked Blank	D10-2-Methylnaphthalene	2018/10/31		90	%	50 - 150
			D10-Fluoranthene	2018/10/31		92	%	50 - 150
			D10-Phenanthrene	2018/10/31		94	%	50 - 150
			D12-Benzo(a)anthracene	2018/10/31		106	%	50 - 150
			D12-Benzo(a)pyrene	2018/10/31		76	%	50 - 150
			D12-Benzo(b)fluoranthene	2018/10/31		112	%	50 - 150
			D12-Benzo(ghi)perylene	2018/10/31		114	%	50 - 150
			D12-Benzo(k)fluoranthene	2018/10/31		106	%	50 - 150
			D12-Chrysene	2018/10/31		106	%	50 - 150
			D12-Indeno(1,2,3-cd)pyrene	2018/10/31		114	%	50 - 150
			D12-Perylene	2018/10/31		56	%	50 - 150
			D14-Dibenzo(a,h)anthracene	2018/10/31		114	%	50 - 150
			D8-Acenaphthylene	2018/10/31		86	%	50 - 150
			D8-Naphthalene	2018/10/31		88	%	50 - 150
			Acenaphthene	2018/10/31		90	%	60 - 130
			Acenaphthylene	2018/10/31		90	%	60 - 130
			Anthracene	2018/10/31		73	%	60 - 130
			Benzo(a)anthracene	2018/10/31		108	%	60 - 130
			Benzo(a)pyrene	2018/10/31		83	%	60 - 130
			Benzo(b)fluoranthene	2018/10/31		115	%	60 - 130
			Benzo(g,h,i)perylene	2018/10/31		115	%	60 - 130
			Benzo(k)fluoranthene	2018/10/31		110	%	60 - 130
			Chrysene	2018/10/31		115	%	60 - 130
			Fluoranthene	2018/10/31		95	%	60 - 130
			Fluorene	2018/10/31		98	%	60 - 130
			Indeno(1,2,3-cd)pyrene	2018/10/31		123	%	60 - 130
			Naphthalene	2018/10/31		100	%	60 - 130
			Phenanthrene	2018/10/31		95	%	60 - 130
			Pyrene	2018/10/31		90	%	60 - 130
5792973	FJI	RPD	Acenaphthene	2018/10/31	0		%	50
			Acenaphthylene	2018/10/31	5.7		%	50
			Anthracene	2018/10/31	3.5		%	50
			Benzo(a)anthracene	2018/10/31	7.2		%	50
			Benzo(a)pyrene	2018/10/31	3.0		%	50
			Benzo(b)fluoranthene	2018/10/31	24		%	50
			Benzo(g,h,i)perylene	2018/10/31	9.1		%	50
			Benzo(k)fluoranthene	2018/10/31	19		%	50
			Chrysene	2018/10/31	6.7		%	50
			Fluoranthene	2018/10/31	5.4		%	50
			Fluorene	2018/10/31	5.3		%	50
			Indeno(1,2,3-cd)pyrene	2018/10/31	11		%	50
			Naphthalene	2018/10/31	2.5		%	50
			Phenanthrene	2018/10/31	2.7		%	50
			Pyrene	2018/10/31	5.7		%	50
5792973	FJI	Method Blank	D10-2-Methylnaphthalene	2018/10/31		86	%	50 - 150
			D10-Fluoranthene	2018/10/31		86	%	50 - 150
			D10-Phenanthrene	2018/10/31		88	%	50 - 150
			D12-Benzo(a)anthracene	2018/10/31		98	%	50 - 150
			D12-Benzo(a)pyrene	2018/10/31		80	%	50 - 150
			D12-Benzo(b)fluoranthene	2018/10/31		106	%	50 - 150
			D12-Benzo(ghi)perylene	2018/10/31		108	%	50 - 150
			D12-Benzo(k)fluoranthene	2018/10/31		102	%	50 - 150

Maxxam Job #: B8R2980
Report Date: 2018/11/09

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			D12-Chrysene	2018/10/31		102	%	50 - 150
			D12-Indeno(1,2,3-cd)pyrene	2018/10/31		106	%	50 - 150
			D12-Perylene	2018/10/31		84	%	50 - 150
			D14-Dibenzo(a,h)anthracene	2018/10/31		106	%	50 - 150
			D8-Acenaphthylene	2018/10/31		78	%	50 - 150
			D8-Naphthalene	2018/10/31		84	%	50 - 150
			1-Methylnaphthalene	2018/10/31	ND, RDL=0.30		ug	
			1-Methylphenanthrene	2018/10/31	ND, RDL=0.30		ug	
			2-Chloronaphthalene	2018/10/31	ND, RDL=0.30		ug	
			2-Methylanthracene	2018/10/31	ND, RDL=0.30		ug	
			2-Methylnaphthalene	2018/10/31	ND, RDL=0.30		ug	
			3-Methylcholanthrene	2018/10/31	ND, RDL=0.30		ug	
			7,12-Dimethylbenzo(a)anthracene	2018/10/31	ND, RDL=1.2		ug	
			9,10-Dimethylanthracene	2018/10/31	ND, RDL=0.30		ug	
			9-Methylphenanthrene	2018/10/31	ND, RDL=0.30		ug	
			Acenaphthene	2018/10/31	ND, RDL=0.30		ug	
			Acenaphthylene	2018/10/31	ND, RDL=0.30		ug	
			Anthracene	2018/10/31	ND, RDL=0.30		ug	
			Benzo(a)anthracene	2018/10/31	ND, RDL=0.30		ug	
			Benzo(a)fluorene	2018/10/31	ND, RDL=0.30		ug	
			Benzo(a)pyrene	2018/10/31	ND, RDL=0.30		ug	
			Benzo(b)fluoranthene	2018/10/31	ND, RDL=0.30		ug	
			Benzo(b)fluorene	2018/10/31	ND, RDL=0.30		ug	
			Benzo(e)pyrene	2018/10/31	ND, RDL=0.30		ug	
			Benzo(g,h,i)perylene	2018/10/31	ND, RDL=0.30		ug	
			Benzo(k)fluoranthene	2018/10/31	ND, RDL=0.30		ug	
			Chrysene	2018/10/31	ND, RDL=0.30		ug	
			Coronene	2018/10/31	ND, RDL=0.30		ug	
			Dibenzo(a,c)anthracene	2018/10/31	ND, RDL=0.30		ug	

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Fluoranthene	2018/10/31	ND, RDL=0.30		ug	
			Fluorene	2018/10/31	ND, RDL=0.30		ug	
			Indeno(1,2,3-cd)pyrene	2018/10/31	ND, RDL=0.30		ug	
			Naphthalene	2018/10/31	ND, RDL=0.30		ug	
			Perylene	2018/10/31	ND, RDL=0.30		ug	
			Phenanthrene	2018/10/31	ND, RDL=0.30		ug	
			Picene	2018/10/31	ND, RDL=0.30		ug	
			Pyrene	2018/10/31	ND, RDL=0.30		ug	
			Tetralin	2018/10/31	ND, RDL=0.30		ug	
			Triphenylene	2018/10/31	ND, RDL=0.30		ug	
5792998	FJI	Spiked Blank	1,2,3,4-Tetrachlorobenzene	2018/10/29		81	%	40 - 130
			1,2,3,5+1,2,4,5-Tetrachlorobenzene	2018/10/29		41	%	40 - 130
			1,2,3-Trichlorobenzene	2018/10/29		80	%	40 - 130
			1,2,4-Trichlorobenzene	2018/10/29		84	%	40 - 130
			1,2-Dichlorobenzene	2018/10/29		64	%	40 - 130
			1,3,5-Trichlorobenzene	2018/10/29		85	%	40 - 130
			1,3-Dichlorobenzene	2018/10/29		54	%	40 - 130
			1,4-Dichlorobenzene	2018/10/29		74	%	40 - 130
			13C6-Hexachlorobenzene	2018/10/29		79	%	30 - 130
			2H3-1,2,4-Trichlorobenzene	2018/10/29		79	%	30 - 130
			2H4-1,3-Dichlorobenzene	2018/10/29		62	%	30 - 130
			Hexachlorobenzene	2018/10/29		82	%	40 - 130
			Pentachlorobenzene	2018/10/29		87	%	40 - 130
5792998	FJI	RPD	1,2,3,4-Tetrachlorobenzene	2018/10/29	12		%	50
			1,2,3,5+1,2,4,5-Tetrachlorobenzene	2018/10/29	16		%	50
			1,2,3-Trichlorobenzene	2018/10/29	18		%	50
			1,2,4-Trichlorobenzene	2018/10/29	21		%	50
			1,2-Dichlorobenzene	2018/10/29	31		%	50
			1,3,5-Trichlorobenzene	2018/10/29	18		%	50
			1,3-Dichlorobenzene	2018/10/29	26		%	50
			1,4-Dichlorobenzene	2018/10/29	35		%	50
			Hexachlorobenzene	2018/10/29	8.6		%	50
			Pentachlorobenzene	2018/10/29	8.5		%	50
5792998	FJI	Method Blank	1,2,3,4-Tetrachlorobenzene	2018/10/29	ND, RDL=0.30		ug	
			1,2,3,5+1,2,4,5-Tetrachlorobenzene	2018/10/29	ND, RDL=0.30		ug	
			1,2,3-Trichlorobenzene	2018/10/29	ND, RDL=0.30		ug	
			1,2,4-Trichlorobenzene	2018/10/29	ND, RDL=0.30		ug	

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2-Dichlorobenzene	2018/10/29	ND, RDL=0.30		ug	
			1,3,5-Trichlorobenzene	2018/10/29	ND, RDL=0.30		ug	
			1,3-Dichlorobenzene	2018/10/29	ND, RDL=0.30		ug	
			1,4-Dichlorobenzene	2018/10/29	ND, RDL=0.30		ug	
			13C6-Hexachlorobenzene	2018/10/29		82	%	30 - 130
			2H3-1,2,4-Trichlorobenzene	2018/10/29		87	%	30 - 130
			2H4-1,3-Dichlorobenzene	2018/10/29		70	%	30 - 130
			Hexachlorobenzene	2018/10/29	ND, RDL=0.30		ug	
			Pentachlorobenzene	2018/10/29	ND, RDL=0.30		ug	
5793003	FJI	Spiked Blank	2,3,4,5-Tetrachlorophenol	2018/11/06		96	%	22 - 134
			2,3,4-Trichlorophenol	2018/11/06		107	%	22 - 134
			2,3,5-Trichlorophenol	2018/11/06		101	%	22 - 134
			2,4 + 2,5-Dichlorophenol	2018/11/06		89	%	22 - 134
			2,4,6-Trichlorophenol	2018/11/06		104	%	22 - 134
			2,6-Dichlorophenol	2018/11/06		97	%	22 - 134
			2-Chlorophenol	2018/11/06		99	%	22 - 134
			3,4,5-Trichlorophenol	2018/11/06		105	%	22 - 134
			3,4-Dichlorophenol	2018/11/06		107	%	22 - 134
			3,5-Dichlorophenol	2018/11/06		97	%	22 - 134
			4-Chlorophenol	2018/11/06		127	%	22 - 134
			D3-2,4-Dichlorophenol	2018/11/06		107	%	20 - 130
			D6-Pentachlorophenol	2018/11/06		144 (1)	%	20 - 130
			Pentachlorophenol	2018/11/06		109	%	22 - 134
			2,3,4,6-Tetrachlorophenol	2018/11/06		105	%	22 - 134
			2,3,5,6-Tetrachlorophenol	2018/11/06		109	%	22 - 134
			2,3,6-Trichlorophenol	2018/11/06		105	%	22 - 134
			2,3-Dichlorophenol	2018/11/06		102	%	22 - 134
			2,4,5-Trichlorophenol	2018/11/06		106	%	22 - 134
			3-Chlorophenol	2018/11/06		96	%	22 - 134
5793003	FJI	RPD	2,3,4,5-Tetrachlorophenol	2018/11/06	16		%	50
			2,3,4-Trichlorophenol	2018/11/06	2.6		%	50
			2,3,5-Trichlorophenol	2018/11/06	6.4		%	50
			2,4 + 2,5-Dichlorophenol	2018/11/06	2.2		%	50
			2,4,6-Trichlorophenol	2018/11/06	1.7		%	50
			2,6-Dichlorophenol	2018/11/06	3.8		%	50
			2-Chlorophenol	2018/11/06	7.3		%	50
			3,4,5-Trichlorophenol	2018/11/06	6.4		%	50
			3,4-Dichlorophenol	2018/11/06	2.7		%	50
			3,5-Dichlorophenol	2018/11/06	3.1		%	50
			4-Chlorophenol	2018/11/06	0.78		%	50
			Pentachlorophenol	2018/11/06	19		%	50
			2,3,4,6-Tetrachlorophenol	2018/11/06	8.5		%	50
			2,3,5,6-Tetrachlorophenol	2018/11/06	11		%	50
			2,3,6-Trichlorophenol	2018/11/06	1.4		%	50
			2,3-Dichlorophenol	2018/11/06	2.3		%	50
			2,4,5-Trichlorophenol	2018/11/06	5.3		%	50

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			3-Chlorophenol	2018/11/06	3.6		%	50
5793003	FJI	Method Blank	2,3,4,5-Tetrachlorophenol	2018/11/06	ND, RDL=0.30		ug	
			2,3,4-Trichlorophenol	2018/11/06	ND, RDL=0.30		ug	
			2,3,5-Trichlorophenol	2018/11/06	ND, RDL=0.30		ug	
			2,4 + 2,5-Dichlorophenol	2018/11/06	ND, RDL=0.30		ug	
			2,4,6-Trichlorophenol	2018/11/06	ND, RDL=0.30		ug	
			2,6-Dichlorophenol	2018/11/06	ND, RDL=0.30		ug	
			2-Chlorophenol	2018/11/06	ND, RDL=0.30		ug	
			3,4,5-Trichlorophenol	2018/11/06	ND, RDL=0.30		ug	
			3,4-Dichlorophenol	2018/11/06	ND, RDL=0.30		ug	
			3,5-Dichlorophenol	2018/11/06	ND, RDL=0.30		ug	
			4-Chlorophenol	2018/11/06	ND, RDL=0.30		ug	
			D3-2,4-Dichlorophenol	2018/11/06		105	%	20 - 130
			D6-Pentachlorophenol	2018/11/06		162 (1)	%	20 - 130
			Pentachlorophenol	2018/11/06	ND, RDL=0.30		ug	
			2,3,4,6-Tetrachlorophenol	2018/11/06	ND, RDL=0.30		ug	
			2,3,5,6-Tetrachlorophenol	2018/11/06	ND, RDL=0.30		ug	
			2,3,6-Trichlorophenol	2018/11/06	ND, RDL=0.30		ug	
			2,3-Dichlorophenol	2018/11/06	ND, RDL=0.30		ug	
			2,4,5-Trichlorophenol	2018/11/06	ND, RDL=0.30		ug	
			3-Chlorophenol	2018/11/06	ND, RDL=0.30		ug	
5793011	CXU	Spiked Blank	C13-233'44'55'-HeptaCB-(189)	2018/11/06		102	%	30 - 140
			C13-233'44'5-HexaCB-(156)	2018/11/06		95	%	30 - 140
			C13-233'44'5'-HexaCB-(157)	2018/11/06		95	%	30 - 140
			C13-233'44'-PentaCB-(105)	2018/11/06		104	%	30 - 140
			C13-23'44'55'-HexaCB-(167)	2018/11/06		94	%	30 - 140
			C13-2344'5-PentaCB-(114)	2018/11/06		98	%	30 - 140
			C13-23'44'5-PentaCB-(118)	2018/11/06		105	%	30 - 140
			C13-2'344'5-PentaCB-(123)	2018/11/06		102	%	30 - 140
			C13-33'44'55'-HexaCB-(169)	2018/11/06		78	%	30 - 140
			C13-33'44'5-PentaCB-(126)	2018/11/06		100	%	30 - 140
			C13-33'44'-TetraCB-(77)	2018/11/06		91	%	30 - 140
			C13-344'5-TetraCB-(81)	2018/11/06		92	%	30 - 140
			33'44'-TetraCB-(77)	2018/11/06		100	%	50 - 150

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			344'5-TetraCB-(81)	2018/11/06		99	%	50 - 150
			233'44'-PentaCB-(105)	2018/11/06		98	%	50 - 150
			2344'5-PentaCB-(114)	2018/11/06		99	%	50 - 150
			23'44'5-PentaCB-(118)	2018/11/06		99	%	50 - 150
			23'44'5'-PentaCB-(123)	2018/11/06		103	%	50 - 150
			33'44'5-PentaCB-(126)	2018/11/06		98	%	50 - 150
			HexaCB-(156)+(157)	2018/11/06		98	%	N/A
			23'44'55'-HexaCB-(167)	2018/11/06		99	%	50 - 150
			33'44'55'-HexaCB-(169)	2018/11/06		104	%	50 - 150
			233'44'55'-HeptaCB-(189)	2018/11/06		102	%	50 - 150
5793011	CXU	RPD	33'44'-TetraCB-(77)	2018/11/06	3.9		%	30
			344'5-TetraCB-(81)	2018/11/06	3.0		%	30
			233'44'-PentaCB-(105)	2018/11/06	6.9		%	30
			2344'5-PentaCB-(114)	2018/11/06	4.9		%	30
			23'44'5-PentaCB-(118)	2018/11/06	4.0		%	30
			23'44'5'-PentaCB-(123)	2018/11/06	1.9		%	30
			33'44'5-PentaCB-(126)	2018/11/06	7.8		%	30
			HexaCB-(156)+(157)	2018/11/06	5.0		%	30
			23'44'55'-HexaCB-(167)	2018/11/06	5.9		%	30
			33'44'55'-HexaCB-(169)	2018/11/06	0.97		%	30
			233'44'55'-HeptaCB-(189)	2018/11/06	4.0		%	30
5793011	CXU	Method Blank	C13-233'44'55'-HeptaCB-(189)	2018/11/06		122	%	30 - 140
			C13-233'44'5-HexaCB-(156)	2018/11/06		108	%	30 - 140
			C13-233'44'5'-HexaCB-(157)	2018/11/06		108	%	30 - 140
			C13-233'44'-PentaCB-(105)	2018/11/06		128	%	30 - 140
			C13-23'44'55'-HexaCB-(167)	2018/11/06		108	%	30 - 140
			C13-2344'5-PentaCB-(114)	2018/11/06		118	%	30 - 140
			C13-23'44'5-PentaCB-(118)	2018/11/06		127	%	30 - 140
			C13-2'344'5-PentaCB-(123)	2018/11/06		125	%	30 - 140
			C13-33'44'55'-HexaCB-(169)	2018/11/06		84	%	30 - 140
			C13-33'44'5-PentaCB-(126)	2018/11/06		121	%	30 - 140
			C13-33'44'-TetraCB-(77)	2018/11/06		105	%	30 - 140
			C13-344'5-TetraCB-(81)	2018/11/06		104	%	30 - 140
			33'44'-TetraCB-(77)	2018/11/06	ND, RDL=0.60		ng	
			344'5-TetraCB-(81)	2018/11/06	ND, RDL=0.60		ng	
			233'44'-PentaCB-(105)	2018/11/06	ND, RDL=0.60		ng	
			2344'5-PentaCB-(114)	2018/11/06	ND, RDL=0.60		ng	
			23'44'5-PentaCB-(118)	2018/11/06	ND, RDL=0.60 (2)		ng	
			23'44'5'-PentaCB-(123)	2018/11/06	ND, RDL=0.60		ng	
			33'44'5-PentaCB-(126)	2018/11/06	ND, RDL=0.60		ng	
			HexaCB-(156)+(157)	2018/11/06	ND, RDL=1.2		ng	
			23'44'55'-HexaCB-(167)	2018/11/06	ND, RDL=0.60		ng	

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			33'44'55'-HexaCB-(169)	2018/11/06	ND, RDL=0.60		ng	
			233'44'55'-HeptaCB-(189)	2018/11/06	ND, RDL=0.60		ng	
5819589	OBC	Spiked Blank	C13-1234678 HeptaCDD	2018/11/04		100	%	25 - 130
			C13-1234678 HeptaCDF	2018/11/04		75	%	25 - 130
			C13-123678 HexaCDD	2018/11/04		81	%	40 - 130
			C13-123678 HexaCDF	2018/11/04		70	%	40 - 130
			C13-12378 PentaCDD	2018/11/04		77	%	40 - 130
			C13-12378 PentaCDF	2018/11/04		74	%	40 - 130
			C13-123789 HexaCDF	2018/11/04		72	%	40 - 130
			C13-2378 TetraCDD	2018/11/04		100	%	40 - 130
			C13-2378 TetraCDF	2018/11/04		79	%	40 - 130
			C13-Octachlorodibenzo-p-Dioxin	2018/11/04		108	%	25 - 130
			2,3,7,8-Tetra CDD	2018/11/04		93	%	80 - 140
			1,2,3,7,8-Penta CDD	2018/11/04		126	%	80 - 140
			1,2,3,4,7,8-Hexa CDD	2018/11/04		110	%	80 - 140
			1,2,3,6,7,8-Hexa CDD	2018/11/04		117	%	80 - 140
			1,2,3,7,8,9-Hexa CDD	2018/11/04		127	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDD	2018/11/04		91	%	80 - 140
			1,2,3,4,6,7,8,9-Octa CDD	2018/11/04		109	%	80 - 140
			2,3,7,8-Tetra CDF	2018/11/04		109	%	80 - 140
			1,2,3,7,8-Penta CDF	2018/11/04		119	%	80 - 140
			2,3,4,7,8-Penta CDF	2018/11/04		116	%	80 - 140
			1,2,3,4,7,8-Hexa CDF	2018/11/04		106	%	80 - 140
			1,2,3,6,7,8-Hexa CDF	2018/11/04		120	%	80 - 140
			2,3,4,6,7,8-Hexa CDF	2018/11/04		124	%	80 - 140
			1,2,3,7,8,9-Hexa CDF	2018/11/04		134	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDF	2018/11/04		112	%	80 - 140
			1,2,3,4,7,8,9-Hepta CDF	2018/11/04		128	%	80 - 140
			1,2,3,4,6,7,8,9-Octa CDF	2018/11/04		97	%	80 - 140
5819589	OBC	RPD	2,3,7,8-Tetra CDD	2018/11/04	2.2		%	20
			1,2,3,7,8-Penta CDD	2018/11/04	1.6		%	20
			1,2,3,4,7,8-Hexa CDD	2018/11/04	0.91		%	20
			1,2,3,6,7,8-Hexa CDD	2018/11/04	9.0		%	20
			1,2,3,7,8,9-Hexa CDD	2018/11/04	2.4		%	20
			1,2,3,4,6,7,8-Hepta CDD	2018/11/04	27 (1)		%	20
			1,2,3,4,6,7,8,9-Octa CDD	2018/11/04	0		%	20
			2,3,7,8-Tetra CDF	2018/11/04	3.7		%	20
			1,2,3,7,8-Penta CDF	2018/11/04	4.9		%	20
			2,3,4,7,8-Penta CDF	2018/11/04	12		%	20
			1,2,3,4,7,8-Hexa CDF	2018/11/04	0		%	20
			1,2,3,6,7,8-Hexa CDF	2018/11/04	7.2		%	20
			2,3,4,6,7,8-Hexa CDF	2018/11/04	2.4		%	20
			1,2,3,7,8,9-Hexa CDF	2018/11/04	6.2 (3)		%	20
			1,2,3,4,6,7,8-Hepta CDF	2018/11/04	0		%	20
			1,2,3,4,7,8,9-Hepta CDF	2018/11/04	5.6		%	20
			1,2,3,4,6,7,8,9-Octa CDF	2018/11/04	0		%	20
5819589	OBC	Method Blank	C13-1234678 HeptaCDD	2018/11/04		78	%	25 - 130
			C13-1234678 HeptaCDF	2018/11/04		66	%	25 - 130
			C13-123678 HexaCDD	2018/11/04		80	%	40 - 130
			C13-123678 HexaCDF	2018/11/04		68	%	40 - 130

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			C13-12378 PentaCDD	2018/11/04		78	%	40 - 130
			C13-12378 PentaCDF	2018/11/04		71	%	40 - 130
			C13-123789 HexaCDF	2018/11/04		71	%	40 - 130
			C13-2378 TetraCDD	2018/11/04		104	%	40 - 130
			C13-2378 TetraCDF	2018/11/04		75	%	40 - 130
			C13-Octachlorodibenzo-p-Dioxin	2018/11/04		99	%	25 - 130
			2,3,7,8-Tetra CDD	2018/11/04	ND, EDL=19		pg	
			1,2,3,7,8-Penta CDD	2018/11/04	ND, EDL=12		pg	
			1,2,3,4,7,8-Hexa CDD	2018/11/04	ND, EDL=7.2		pg	
			1,2,3,6,7,8-Hexa CDD	2018/11/04	ND, EDL=7.0		pg	
			1,2,3,7,8,9-Hexa CDD	2018/11/04	ND, EDL=6.6		pg	
			1,2,3,4,6,7,8-Hepta CDD	2018/11/04	10.5, EDL=6.4		pg	
			1,2,3,4,6,7,8,9-Octa CDD	2018/11/04	35.0, EDL=7.1		pg	
			Total Tetra CDD	2018/11/04	ND, EDL=69 (2)		pg	
			Total Penta CDD	2018/11/04	ND, EDL=53 (2)		pg	
			Total Hexa CDD	2018/11/04	ND, EDL=150 (2)		pg	
			Total Hepta CDD	2018/11/04	10.5, EDL=6.4		pg	
			2,3,7,8-Tetra CDF	2018/11/04	ND, EDL=11		pg	
			1,2,3,7,8-Penta CDF	2018/11/04	ND, EDL=8.4		pg	
			2,3,4,7,8-Penta CDF	2018/11/04	ND, EDL=8.5		pg	
			1,2,3,4,7,8-Hexa CDF	2018/11/04	ND, EDL=7.8		pg	
			1,2,3,6,7,8-Hexa CDF	2018/11/04	ND, EDL=7.7		pg	
			2,3,4,6,7,8-Hexa CDF	2018/11/04	ND, EDL=8.5		pg	
			1,2,3,7,8,9-Hexa CDF	2018/11/04	11.5, EDL=9.7		pg	
			1,2,3,4,6,7,8-Hepta CDF	2018/11/04	7.8, EDL=6.3		pg	
			1,2,3,4,7,8,9-Hepta CDF	2018/11/04	12.7, EDL=8.3		pg	
			1,2,3,4,6,7,8,9-Octa CDF	2018/11/04	27.0, EDL=6.1		pg	
			Total Tetra CDF	2018/11/04	ND, EDL=11		pg	
			Total Penta CDF	2018/11/04	ND, EDL=8.4		pg	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Total Hexa CDF	2018/11/04	11.5, EDL=8.4		pg	
			Total Hepta CDF	2018/11/04	20.5, EDL=7.2		pg	

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

(3) Recovery exceeds method criteria

Maxxam Job #: B8R2980
Report Date: 2018/11/09

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Cathy Xu, Scientific Specialist, Ultra Trace Analysis, HRMS

Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

Rodney Major, Manager Organic Processing Lab

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Chain of Custody Form - AIR

B8R2682 (SVOC) B8R2980

11569

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Page 1 of 2

CLIENT INFORMATION

SECTION

Company Name: RWDI
Project Manager: KIRK EASTO
e-mail: KIRK.EASTO@RWDI.COM
Address: GUELPH ON

Phone: 519-823-1311 Fax:
Sampled by: KNE/JBF/MP

ANALYSIS REQUESTED

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time	ENVIRONMENT CANADA RM/2	USEPA METHOD 29 uSEPA M#5	USEPA METHOD 26	USEPA METHOD 201
T1-ALT FUELS-SVOC (6 PCS)			10/10/18		✓			
T2-ALT FUELS SVOC (6 PCS)			10/12/18		✓			
T3-ALT FUELS-SVOC (6 PCS)			10/12/18		✓			
T1-ALT FUELS-M29-(7 PCS)			10/10/18			✓		
T2-ALT FUELS-M29-(7 PCS)			10/12/18			✓		
T3-ALT FUELS-M29-(7 PCS)			10/12/18			✓		
T1/T2/T3-ALT FUELS-M26 (3 PCS)			10/10/18				✓	
T1-ALT FUELS-PM10 (4 PCS)			10/10/18					✓
T2-ALT FUELS-PM10 (4 PCS)			10/12/18					✓
T3-ALT FUELS-PM10 (4 PCS)			10/12/18					✓
PM10 BLANK (1 PC)								✓
M29-BLANK (7 PCS)						✓		

TAT Requirement

STD 10 Business day ☑
Rush 5 Business day * ☐
Rush 2 Business day * ☐
* need approval from Maxxam

PROJECT INFORMATION

Project #: 1804600
Name: ST MARYS
PO #: 1804600
Maxxam Quote #:
Maxxam Contact:

REPORTING REQUIREMENTS

Summary Report only ☐
EDD ☐
Regulation

Notes

PROJECT SPECIFIC COMMENTS

Client Signature: JOE FROST
Affiliation: TECH.
Date/Time: 10/15/18

Received by: [signature]
Affiliation:
Date/Time: 2018/10/15 15:21

12.1/11.0/11.8

COC-1031 (04/13) - Air

(VOST) B8R2640 / B8R2682

Chain of Custody Form - AIR

11570

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Mississauga Ontario ,L5N 2L8
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Phone: (905) 817-5700
Fax: (905) 817-5777

Page 2 of 2

CLIENT INFORMATION SECTION

Company Name: RWDI
Project Manager: KIER EASTO
e-mail:
Address:

Phone: Fax:

Sampled by:

ANALYSIS REQUESTED

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time	ENVIRONMENT CANADA RM 12	USEPA METHOD 26	USEPA SW846 0030 VOST										
SVOC BLANK (6 PCS)					✓												
M26 - BLANK						✓											
VOST - BLANK							✓										
VOST - ALT FUELS - T1			10/12/15				✓										
VOST - ALT FUELS - T2			10/12/15				✓										
VOST - ALT FUELS - T3			10/12/15				✓										

TAT Requirement
STD 10 Business day ☐
Rush 5 Business day * ☐
Rush 2 Business day * ☐
* need approval from Maxxam

PROJECT INFORMATION
Project #: 1504600
Name:
PO #: 1504600
Maxxam Quote #:
Maxxam Contact:

REPORTING REQUIREMENTS
Summary Report only ☐
EDD ☐
Regulation

Notes

PROJECT SPECIFIC COMMENTS

Client Signature:
Affiliation:
Date/Time:

Received by: See page one JL 18/10/15
Affiliation:
Date/Time:

COC-1031 (04/13) - Air

Your P.O. #: 1804600
Your Project #: 1804600
Site Location: ST. MARYS
Your C.O.C. #: 32140

Attention: Kirk Easto

RWDI West Inc
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2019/03/07
Report #: R5620417
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B8Q9027
Received: 2018/10/09, 08:30

Sample Matrix: Stack Sampling Train
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Chlorobenzenes in MM5 Trains (EPA M0010)	3	2018/10/19	2018/10/29	BRL SOP-00202	In house (M0010)
Chlorophenols in MM5 Trains (EPA M0010)	3	2018/10/19	2018/11/07	BRL SOP-00204	In house (M0010)
Dioxins/Furans in Air (Method 23)	3	2018/10/19	2018/11/04	BRL SOP-00404	EPA M23/23A m
PAH's in MM5 SamplingTrains (CARB429mod)	2	2018/10/19	2018/10/31	BRL SOP-00201	CARB429(ARBM1,M2)mod
PAH's in MM5 SamplingTrains (CARB429mod)	1	2018/10/19	2018/11/01	BRL SOP-00201	CARB429(ARBM1,M2)mod
PCBs in a Sampling Train (1668Amod)	3	2018/10/19	2018/11/06	BRL SOP-00408	EPA 1668A m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

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Your P.O. #: 1804600
Your Project #: 1804600
Site Location: ST. MARYS
Your C.O.C. #: 32140

Attention: Kirk Easto

RWDI West Inc
600 Southgate Drive
Guelph, ON
Canada N1G 4P6

Report Date: 2019/03/07
Report #: R5620417
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B8Q9027
Received: 2018/10/09, 08:30

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769
==
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A Bureau Veritas Group Company

Maxxam Job #: B8Q9027
Report Date: 2019/03/07

RWDI West Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

RESULTS OF ANALYSES OF STACK SAMPLING TRAIN

Maxxam ID		HZP289						
Sampling Date		2018/09/30						
COC Number		32140			TOXIC EQUIVALENCY		# of	
	UNITS	**SVOC T1**	**EDL**	**RDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
33'44'-TetraCB-(77)	ng	ND	0.057	0.60	0.00010	0.0000057		5793011
344'5-TetraCB-(81)	ng	ND	0.056	0.60	0.00030	0.000017		5793011
233'44'-PentaCB-(105)	ng	0.22	0.026	0.60	0.000030	0.0000066		5793011
2344'5-PentaCB-(114)	ng	ND	0.026	0.60	0.000030	0.00000078		5793011
23'44'5-PentaCB-(118)	ng	0.46	0.026	0.60	0.000030	0.000014		5793011
23'44'5'-PentaCB-(123)	ng	ND	0.029	0.60	0.000030	0.00000087		5793011
33'44'5-PentaCB-(126)	ng	ND	0.025	0.60	0.10	0.0025		5793011
HexaCB-(156)+(157)	ng	0.091	0.048	1.2	0.000030	0.0000027		5793011
23'44'55'-HexaCB-(167)	ng	ND	0.046	0.60	0.000030	0.0000014		5793011
33'44'55'-HexaCB-(169)	ng	ND	0.049	0.60	0.030	0.0015		5793011
233'44'55'-HeptaCB-(189)	ng	ND	0.046	0.60	0.000030	0.0000014		5793011
TOTAL TOXIC EQUIVALENCY	ng					0.0041		
Surrogate Recovery (%)								
C13-233'44'55'-HeptaCB-(189)	%	103						5793011
C13-233'44'5-HexaCB-(156)	%	76						5793011
C13-233'44'5'-HexaCB-(157)	%	76						5793011
C13-233'44'-PentaCB-(105)	%	82						5793011
C13-23'44'55'-HexaCB-(167)	%	78						5793011
C13-2344'5-PentaCB-(114)	%	79						5793011
C13-23'44'5-PentaCB-(118)	%	83						5793011
C13-2'344'5-PentaCB-(123)	%	80						5793011
C13-33'44'55'-HexaCB-(169)	%	53						5793011
C13-33'44'5-PentaCB-(126)	%	81						5793011
C13-33'44'-TetraCB-(77)	%	90						5793011
C13-344'5-TetraCB-(81)	%	91						5793011

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

ND = Not detected

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Maxxam Job #: B8Q9027
Report Date: 2019/03/07

RWDI West Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

RESULTS OF ANALYSES OF STACK SAMPLING TRAIN

Maxxam ID		HZP290						
Sampling Date		2018/10/01						
COC Number		32140			TOXIC EQUIVALENCY		# of	
	UNITS	SVOC T2	EDL	RDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
33'44'-TetraCB-(77)	ng	ND	0.073	0.60	0.00010	0.0000073		5793011
344'5-TetraCB-(81)	ng	ND	0.072	0.60	0.00030	0.000022		5793011
233'44'-PentaCB-(105)	ng	0.18	0.056	0.60	0.000030	0.0000054		5793011
2344'5-PentaCB-(114)	ng	ND	0.056	0.60	0.000030	0.0000017		5793011
23'44'5-PentaCB-(118)	ng	0.39	0.055	0.60	0.000030	0.000012		5793011
23'44'5'-PentaCB-(123)	ng	ND	0.062	0.60	0.000030	0.0000019		5793011
33'44'5-PentaCB-(126)	ng	ND	0.053	0.60	0.10	0.0053		5793011
HexaCB-(156)+(157)	ng	ND	0.067	1.2	0.000030	0.0000020		5793011
23'44'55'-HexaCB-(167)	ng	ND	0.063	0.60	0.000030	0.0000019		5793011
33'44'55'-HexaCB-(169)	ng	ND	0.068	0.60	0.030	0.0020		5793011
233'44'55'-HeptaCB-(189)	ng	ND	0.046	0.60	0.000030	0.0000014		5793011
TOTAL TOXIC EQUIVALENCY	ng					0.0074		
Surrogate Recovery (%)								
C13-233'44'55'-HeptaCB-(189)	%	103						5793011
C13-233'44'5-HexaCB-(156)	%	73						5793011
C13-233'44'5'-HexaCB-(157)	%	73						5793011
C13-233'44'-PentaCB-(105)	%	79						5793011
C13-23'44'55'-HexaCB-(167)	%	75						5793011
C13-2344'5-PentaCB-(114)	%	73						5793011
C13-23'44'5-PentaCB-(118)	%	78						5793011
C13-2'344'5-PentaCB-(123)	%	75						5793011
C13-33'44'55'-HexaCB-(169)	%	53						5793011
C13-33'44'5-PentaCB-(126)	%	72						5793011
C13-33'44'-TetraCB-(77)	%	84						5793011
C13-344'5-TetraCB-(81)	%	84						5793011

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B8Q9027
Report Date: 2019/03/07

RWDI West Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

RESULTS OF ANALYSES OF STACK SAMPLING TRAIN

Maxxam ID		HZP291						
Sampling Date		2018/10/02						
COC Number		32140			**TOXIC EQUIVALENCY**		# of	
	UNITS	**SVOC T3**	**EDL**	**RDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
33'44'-TetraCB-(77)	ng	ND	0.073	0.60	0.00010	0.0000073		5793011
344'5-TetraCB-(81)	ng	ND	0.072	0.60	0.00030	0.000022		5793011
233'44'-PentaCB-(105)	ng	0.069	0.033	0.60	0.000030	0.0000021		5793011
2344'5-PentaCB-(114)	ng	ND	0.034	0.60	0.000030	0.0000010		5793011
23'44'5-PentaCB-(118)	ng	0.18	0.033	0.60	0.000030	0.0000054		5793011
23'44'5'-PentaCB-(123)	ng	ND	0.037	0.60	0.000030	0.0000011		5793011
33'44'5-PentaCB-(126)	ng	ND	0.031	0.60	0.10	0.0031		5793011
HexaCB-(156)+(157)	ng	ND	0.063	1.2	0.000030	0.0000019		5793011
23'44'55'-HexaCB-(167)	ng	ND	0.060	0.60	0.000030	0.0000018		5793011
33'44'55'-HexaCB-(169)	ng	ND	0.064	0.60	0.030	0.0019		5793011
233'44'55'-HeptaCB-(189)	ng	ND	0.12	0.60	0.000030	0.0000036		5793011
TOTAL TOXIC EQUIVALENCY	ng					0.0050		
Surrogate Recovery (%)								
C13-233'44'55'-HeptaCB-(189)	%	105						5793011
C13-233'44'5-HexaCB-(156)	%	74						5793011
C13-233'44'5'-HexaCB-(157)	%	74						5793011
C13-233'44'-PentaCB-(105)	%	81						5793011
C13-23'44'55'-HexaCB-(167)	%	76						5793011
C13-2344'5-PentaCB-(114)	%	78						5793011
C13-23'44'5-PentaCB-(118)	%	83						5793011
C13-2'344'5-PentaCB-(123)	%	79						5793011
C13-33'44'55'-HexaCB-(169)	%	53						5793011
C13-33'44'5-PentaCB-(126)	%	74						5793011
C13-33'44'-TetraCB-(77)	%	92						5793011
C13-344'5-TetraCB-(81)	%	94						5793011

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

ND = Not detected

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Maxxam Job #: B8Q9027
Report Date: 2019/03/07

RWDI West Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

SEMI-VOLATILE ORGANICS BY GC-MS (STACK SAMPLING TRAIN)

Maxxam ID		HZP289	HZP290	HZP291		
Sampling Date		2018/09/30	2018/10/01	2018/10/02		
COC Number		32140	32140	32140		
	UNITS	**SVOC T1**	**SVOC T2**	**SVOC T3**	**RDL**	**QC Batch**
1-Methylnaphthalene	ug	322	313	304	6.0	5792973
1-Methylphenanthrene	ug	0.96	1.02	0.66	0.30	5792973
2-Chloronaphthalene	ug	4.08	7.32	4.86	0.30	5792973
2-Methylanthracene	ug	ND	ND	ND	0.30	5792973
2-Methylnaphthalene	ug	448	446	418	6.0	5792973
3-Methylcholanthrene	ug	ND	ND	ND	0.30	5792973
7,12-Dimethylbenzo(a)anthracene	ug	ND	ND	ND	1.2	5792973
9,10-Dimethylanthracene	ug	ND	ND	ND	0.30	5792973
9-Methylphenanthrene	ug	1.98	2.22	1.86	0.30	5792973
Acenaphthene	ug	4.44	8.70	5.46	0.30	5792973
Acenaphthylene	ug	6.30	9.84	7.08	0.30	5792973
Anthracene	ug	0.66	0.60	0.48	0.30	5792973
Benzo(a)anthracene	ug	ND	ND	ND	0.30	5792973
Benzo(a)fluorene	ug	ND	ND	ND	0.30	5792973
Benzo(a)pyrene	ug	ND	ND	ND	0.30	5792973
Benzo(b)fluoranthene	ug	ND	ND	ND	0.30	5792973
Benzo(b)fluorene	ug	ND	ND	ND	0.30	5792973
Benzo(e)pyrene	ug	ND	ND	ND	0.30	5792973
Benzo(g,h,i)perylene	ug	ND	ND	ND	0.30	5792973
Benzo(k)fluoranthene	ug	ND	ND	ND	0.30	5792973
Biphenyl	ug	138	139	137	6.0	5792973
Chrysene	ug	ND	ND	ND	0.30	5792973
Coronene	ug	ND	ND	ND	0.30	5792973
Dibenzo(a,c)anthracene	ug	ND	ND	ND	0.30	5792973
Fluoranthene	ug	ND	ND	ND	0.30	5792973
Fluorene	ug	2.46	3.96	2.46	0.30	5792973
Indeno(1,2,3-cd)pyrene	ug	ND	ND	ND	0.30	5792973
m-Terphenyl	ug	ND	ND	ND	0.30	5792973
Naphthalene	ug	788	739	716	6.0	5792973
o-Terphenyl	ug	0.36	0.36	0.30	0.30	5792973
Perylene	ug	ND	ND	ND	0.30	5792973
Phenanthrene	ug	12.0	14.8	11.2	0.30	5792973
Picene	ug	ND	ND	ND	0.30	5792973
p-Terphenyl	ug	ND	ND	ND	0.30	5792973
Pyrene	ug	ND	ND	ND	0.30	5792973

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B8Q9027
Report Date: 2019/03/07

RWDI West Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

SEMI-VOLATILE ORGANICS BY GC-MS (STACK SAMPLING TRAIN)

Maxxam ID		HZP289	HZP290	HZP291		
Sampling Date		2018/09/30	2018/10/01	2018/10/02		
COC Number		32140	32140	32140		
	UNITS	**SVOC T1**	**SVOC T2**	**SVOC T3**	**RDL**	**QC Batch**
Tetralin	ug	206	191	188	6.0	5792973
Triphenylene	ug	ND	ND	ND	0.30	5792973
1,2,3,4-Tetrachlorobenzene	ug	ND	ND	ND	0.30	5792998
1,2,3,5+1,2,4,5-Tetrachlorobenzene	ug	ND	ND	ND	0.30	5792998
1,2,3-Trichlorobenzene	ug	0.71	3.69	0.96	0.30	5792998
1,2,4-Trichlorobenzene	ug	1.45	1.57	1.70	0.30	5792998
1,2-Dichlorobenzene	ug	9.30	5.32	6.07	0.30	5792998
1,3,5-Trichlorobenzene	ug	0.39	ND	ND	0.30	5792998
1,3-Dichlorobenzene	ug	2.11	2.35	1.91	0.30	5792998
1,4-Dichlorobenzene	ug	1.39	1.69	1.84	0.30	5792998
Hexachlorobenzene	ug	ND	ND	ND	0.30	5792998
Pentachlorobenzene	ug	ND	ND	ND	0.30	5792998
2,3,4,5-Tetrachlorophenol	ug	ND	ND	ND	0.30	5793003
2,3,4,6-Tetrachlorophenol	ug	ND	ND	ND	0.30	5793003
2,3,4-Trichlorophenol	ug	ND	ND	ND	0.30	5793003
2,3,5,6-Tetrachlorophenol	ug	ND	ND	ND	0.30	5793003
2,3,5-Trichlorophenol	ug	ND	ND	ND	0.30	5793003
2,3,6-Trichlorophenol	ug	ND	ND	ND	0.30	5793003
2,3-Dichlorophenol	ug	ND	ND	ND	0.30	5793003
2,4 + 2,5-Dichlorophenol	ug	ND	ND	ND	0.30	5793003
2,4,5-Trichlorophenol	ug	ND	ND	ND	0.30	5793003
2,4,6-Trichlorophenol	ug	ND	ND	ND	0.30	5793003
2,6-Dichlorophenol	ug	ND	ND	ND	0.30	5793003
2-Chlorophenol	ug	7.83	7.67	6.05	0.30	5793003
3,4,5-Trichlorophenol	ug	ND	ND	ND	0.30	5793003
3,4-Dichlorophenol	ug	ND	ND	ND	0.30	5793003
3,5-Dichlorophenol	ug	ND	ND	ND	0.30	5793003
3-Chlorophenol	ug	1.51	1.13	0.74	0.30	5793003
4-Chlorophenol	ug	1.86	1.54	1.45	0.30	5793003
Pentachlorophenol	ug	ND	ND	ND	0.30	5793003
Surrogate Recovery (%)						
13C6-Hexachlorobenzene	%	124	97	99		5792998
2H3-1,2,3-Trichlorobenzene (FS)	%	95	100	94		5792998
2H3-1,2,4-Trichlorobenzene	%	89	98	91		5792998
2H4-1,3-Dichlorobenzene	%	114	114	127		5792998

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Maxxam Job #: B8Q9027
Report Date: 2019/03/07

RWDI West Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

SEMI-VOLATILE ORGANICS BY GC-MS (STACK SAMPLING TRAIN)

Maxxam ID		HZP289	HZP290	HZP291		
Sampling Date		2018/09/30	2018/10/01	2018/10/02		
COC Number		32140	32140	32140		
	UNITS	**SVOC T1**	**SVOC T2**	**SVOC T3**	**RDL**	**QC Batch**
2H4-1,4-Dichlorobenzene (FS)	%	91	104	133 (1)		5792998
2,6-Dibromo-4-fluorophenol (FS)	%	98	95	94		5793003
D3-2,4-Dichlorophenol	%	101	99	96		5793003
D6-Pentachlorophenol	%	137 (1)	137 (1)	139 (1)		5793003
D10-2-Methylnaphthalene	%	144	228 (2)	168 (2)		5792973
D10-Anthracene	%	72	92	82		5792973
D10-Fluoranthene	%	94	114	96		5792973
D10-Fluorene (FS)	%	76	102	76		5792973
D10-Phenanthrene	%	88	112	88		5792973
D12-Benzo(a)anthracene	%	116	116	108		5792973
D12-Benzo(a)pyrene	%	110	104	100		5792973
D12-Benzo(b)fluoranthene	%	118	112	106		5792973
D12-Benzo(ghi)perylene	%	116	112	104		5792973
D12-Benzo(k)fluoranthene	%	110	110	100		5792973
D12-Chrysene	%	110	112	100		5792973
D12-Indeno(1,2,3-cd)pyrene	%	116	110	102		5792973
D12-Perylene	%	110	104	100		5792973
D14-Dibenzo(a,h)anthracene	%	118	112	104		5792973
D14-Terphenyl (FS)	%	90	110	100		5792973
D8-Acenaphthylene	%	92	116	98		5792973
D8-Naphthalene	%	128	194 (2)	122		5792973

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.
(2) Surrogate recovery was above the upper control limit due to matrix interference. This may represent a high bias in some results.

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Maxxam Job #: B8Q9027
Report Date: 2019/03/07

RWDI West Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (STACK SAMPLING TRAIN)

Maxxam ID		HZP289						
Sampling Date		2018/09/30						
COC Number		32140			TOXIC EQUIVALENCY		# of	
	UNITS	SVOC T1	EDL	RDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	ND	13	60	1.00	13.0		5819589
1,2,3,7,8-Penta CDD *	pg	ND	7.1	60	1.00	7.10		5819589
1,2,3,4,7,8-Hexa CDD *	pg	ND	6.5	60	0.100	0.650		5819589
1,2,3,6,7,8-Hexa CDD *	pg	ND	6.4	60	0.100	0.640		5819589
1,2,3,7,8,9-Hexa CDD *	pg	ND	6.0	60	0.100	0.600		5819589
1,2,3,4,6,7,8-Hepta CDD *	pg	ND	6.1	60	0.0100	0.0610		5819589
1,2,3,4,6,7,8,9-Octa CDD *	pg	26.1	6.7	600	0.000300	0.00783		5819589
Total Tetra CDD *	pg	ND (1)	74	60			0	5819589
Total Penta CDD *	pg	ND (1)	64	60			0	5819589
Total Hexa CDD *	pg	ND (1)	180	60			0	5819589
Total Hepta CDD *	pg	ND	6.1	60			0	5819589
2,3,7,8-Tetra CDF **	pg	ND	9.0	60	0.100	0.900		5819589
1,2,3,7,8-Penta CDF **	pg	ND	6.5	60	0.0300	0.195		5819589
2,3,4,7,8-Penta CDF **	pg	ND	6.5	60	0.300	1.95		5819589
1,2,3,4,7,8-Hexa CDF **	pg	ND	6.0	60	0.100	0.600		5819589
1,2,3,6,7,8-Hexa CDF **	pg	ND	5.9	60	0.100	0.590		5819589
2,3,4,6,7,8-Hexa CDF **	pg	ND	6.5	60	0.100	0.650		5819589
1,2,3,7,8,9-Hexa CDF **	pg	ND	7.5	60	0.100	0.750		5819589
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	6.2	60	0.0100	0.0620		5819589
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	8.0	60	0.0100	0.0800		5819589
1,2,3,4,6,7,8,9-Octa CDF **	pg	10.2	6.9	600	0.000300	0.00306		5819589
Total Tetra CDF **	pg	ND	9.0	60			0	5819589
Total Penta CDF **	pg	ND	6.5	60			0	5819589
Total Hexa CDF **	pg	ND	6.4	60			0	5819589
Total Hepta CDF **	pg	ND	7.0	60			0	5819589
TOTAL TOXIC EQUIVALENCY	pg					27.8		

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
** CDF = Chloro Dibenzo-p-Furan
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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DIOXINS AND FURANS BY HRMS (STACK SAMPLING TRAIN)

Maxxam ID		HZP289						
Sampling Date		2018/09/30						
COC Number		32140			**TOXIC EQUIVALENCY**		# of	
	UNITS	**SVOC T1**	**EDL**	**RDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Surrogate Recovery (%)								
C13-1234678 HeptaCDD *	%	86						5819589
C13-1234678 HeptaCDF **	%	69						5819589
C13-123478 HexaCDD *	%	113						5819589
C13-123478 HexaCDF **	%	105						5819589
C13-1234789 HeptaCDF **	%	119						5819589
C13-123678 HexaCDD *	%	88						5819589
C13-123678 HexaCDF **	%	76						5819589
C13-12378 PentaCDD *	%	103						5819589
C13-12378 PentaCDF **	%	85						5819589
C13-123789 HexaCDF **	%	72						5819589
C13-23478 PentaCDF **	%	120						5819589
C13-2378 TetraCDD *	%	121						5819589
C13-2378 TetraCDF **	%	78						5819589
C13-Octachlorodibenzo-p-Dioxin	%	99						5819589
Cl37-2378 TetraCDD *	%	81						5819589

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B8Q9027
Report Date: 2019/03/07

RWDI West Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (STACK SAMPLING TRAIN)

Maxxam ID		HZP290						
Sampling Date		2018/10/01						
COC Number		32140			TOXIC EQUIVALENCY		# of	
	UNITS	SVOC T2	EDL	RDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	ND	17	60	1.00	17.0		5819589
1,2,3,7,8-Penta CDD *	pg	ND	9.7	60	1.00	9.70		5819589
1,2,3,4,7,8-Hexa CDD *	pg	ND	6.5	60	0.100	0.650		5819589
1,2,3,6,7,8-Hexa CDD *	pg	ND	6.3	60	0.100	0.630		5819589
1,2,3,7,8,9-Hexa CDD *	pg	ND	5.9	60	0.100	0.590		5819589
1,2,3,4,6,7,8-Hepta CDD *	pg	ND	9.2	60	0.0100	0.0920		5819589
1,2,3,4,6,7,8,9-Octa CDD *	pg	14.2 (1)	6.3	600	0.000300	0.00426		5819589
Total Tetra CDD *	pg	ND (2)	78	60			0	5819589
Total Penta CDD *	pg	ND (2)	70	60			0	5819589
Total Hexa CDD *	pg	ND (2)	160	60			0	5819589
Total Hepta CDD *	pg	ND	9.2	60			0	5819589
2,3,7,8-Tetra CDF **	pg	ND	8.7	60	0.100	0.870		5819589
1,2,3,7,8-Penta CDF **	pg	ND	7.6	60	0.0300	0.228		5819589
2,3,4,7,8-Penta CDF **	pg	ND	7.6	60	0.300	2.28		5819589
1,2,3,4,7,8-Hexa CDF **	pg	ND	6.4	60	0.100	0.640		5819589
1,2,3,6,7,8-Hexa CDF **	pg	ND	6.3	60	0.100	0.630		5819589
2,3,4,6,7,8-Hexa CDF **	pg	ND	7.0	60	0.100	0.700		5819589
1,2,3,7,8,9-Hexa CDF **	pg	ND	7.9	60	0.100	0.790		5819589
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	5.7	60	0.0100	0.0570		5819589
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	7.4	60	0.0100	0.0740		5819589
1,2,3,4,6,7,8,9-Octa CDF **	pg	ND	6.8	600	0.000300	0.00204		5819589
Total Tetra CDF **	pg	ND (2)	18	60			0	5819589
Total Penta CDF **	pg	ND	7.6	60			0	5819589
Total Hexa CDF **	pg	ND	6.8	60			0	5819589
Total Hepta CDF **	pg	ND	6.5	60			0	5819589

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

ND = Not detected

** CDF = Chloro Dibenzo-p-Furan

(1) EMPC / Ratio - Isotopic ratio adjusted to meet theoretical

(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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Maxxam Job #: B8Q9027
Report Date: 2019/03/07

RWDI West Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (STACK SAMPLING TRAIN)

Maxxam ID		HZP290						
Sampling Date		2018/10/01						
COC Number		32140			**TOXIC EQUIVALENCY**		# of	
	UNITS	**SVOC T2**	**EDL**	**RDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
TOTAL TOXIC EQUIVALENCY	pg					34.9		
Surrogate Recovery (%)								
C13-1234678 HeptaCDD *	%	89						5819589
C13-1234678 HeptaCDF **	%	72						5819589
C13-123478 HexaCDD *	%	105						5819589
C13-123478 HexaCDF **	%	95						5819589
C13-1234789 HeptaCDF **	%	115						5819589
C13-123678 HexaCDD *	%	91						5819589
C13-123678 HexaCDF **	%	81						5819589
C13-12378 PentaCDD *	%	84						5819589
C13-12378 PentaCDF **	%	71						5819589
C13-123789 HexaCDF **	%	72						5819589
C13-23478 PentaCDF **	%	119						5819589
C13-2378 TetraCDD *	%	99						5819589
C13-2378 TetraCDF **	%	67						5819589
C13-Octachlorodibenzo-p-Dioxin	%	97						5819589
Cl37-2378 TetraCDD *	%	91						5819589

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8Q9027
Report Date: 2019/03/07

RWDI West Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (STACK SAMPLING TRAIN)

Maxxam ID		HZP291						
Sampling Date		2018/10/02						
COC Number		32140			TOXIC EQUIVALENCY		# of	
	UNITS	SVOC T3	EDL	RDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	ND	18	60	1.00	18.0		5819589
1,2,3,7,8-Penta CDD *	pg	ND	9.3	60	1.00	9.30		5819589
1,2,3,4,7,8-Hexa CDD *	pg	ND	7.0	60	0.100	0.700		5819589
1,2,3,6,7,8-Hexa CDD *	pg	ND	6.9	60	0.100	0.690		5819589
1,2,3,7,8,9-Hexa CDD *	pg	ND	6.4	60	0.100	0.640		5819589
1,2,3,4,6,7,8-Hepta CDD *	pg	11.3	6.8	60	0.0100	0.113		5819589
1,2,3,4,6,7,8,9-Octa CDD *	pg	22.0	6.7	600	0.000300	0.00660		5819589
Total Tetra CDD *	pg	ND (1)	80	60			0	5819589
Total Penta CDD *	pg	ND (1)	68	60			0	5819589
Total Hexa CDD *	pg	ND (1)	150	60			0	5819589
Total Hepta CDD *	pg	11.3	6.8	60			1	5819589
2,3,7,8-Tetra CDF **	pg	ND (2)	13	60	0.100	1.30		5819589
1,2,3,7,8-Penta CDF **	pg	ND	6.8	60	0.0300	0.204		5819589
2,3,4,7,8-Penta CDF **	pg	ND	6.9	60	0.300	2.07		5819589
1,2,3,4,7,8-Hexa CDF **	pg	ND	6.3	60	0.100	0.630		5819589
1,2,3,6,7,8-Hexa CDF **	pg	ND	6.2	60	0.100	0.620		5819589
2,3,4,6,7,8-Hexa CDF **	pg	ND	6.8	60	0.100	0.680		5819589
1,2,3,7,8,9-Hexa CDF **	pg	ND	7.8	60	0.100	0.780		5819589
1,2,3,4,6,7,8-Hepta CDF **	pg	6.9	5.6	60	0.0100	0.0690		5819589
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	7.3	60	0.0100	0.0730		5819589
1,2,3,4,6,7,8,9-Octa CDF **	pg	ND	6.5	600	0.000300	0.00195		5819589
Total Tetra CDF **	pg	13.1	9.6	60			1	5819589
Total Penta CDF **	pg	ND (1)	12	60			0	5819589
Total Hexa CDF **	pg	ND	6.7	60			0	5819589

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
** CDF = Chloro Dibenzo-p-Furan
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.
(2) RT > 3 seconds - PCDD/DF analysis - Peak detected exceeds expected retention time (from internal standard) by greater than 3 seconds.

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Maxxam Job #: B8Q9027
Report Date: 2019/03/07

RWDI West Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (STACK SAMPLING TRAIN)

Maxxam ID		HZP291						
Sampling Date		2018/10/02						
COC Number		32140			**TOXIC EQUIVALENCY**		# of	
	UNITS	**SVOC T3**	**EDL**	**RDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Total Hepta CDF **	pg	6.9	6.4	60			1	5819589
TOTAL TOXIC EQUIVALENCY	pg					35.9		
Surrogate Recovery (%)								
C13-1234678 HeptaCDD *	%	87						5819589
C13-1234678 HeptaCDF **	%	74						5819589
C13-123478 HexaCDD *	%	102						5819589
C13-123478 HexaCDF **	%	99						5819589
C13-1234789 HeptaCDF **	%	116						5819589
C13-123678 HexaCDD *	%	96						5819589
C13-123678 HexaCDF **	%	80						5819589
C13-12378 PentaCDD *	%	91						5819589
C13-12378 PentaCDF **	%	72						5819589
C13-123789 HexaCDF **	%	70						5819589
C13-23478 PentaCDF **	%	118						5819589
C13-2378 TetraCDD *	%	101						5819589
C13-2378 TetraCDF **	%	74						5819589
C13-Octachlorodibenzo-p-Dioxin	%	99						5819589
Cl37-2378 TetraCDD *	%	89						5819589

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
** CDF = Chloro Dibenzo-p-Furan
* CDD = Chloro Dibenzo-p-Dioxin

Maxxam Job #: B8Q9027
Report Date: 2019/03/07

RWDI West Inc
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TEST SUMMARY

Maxxam ID: HZP289
Sample ID: SVOC T1
Matrix: Stack Sampling Train

Collected: 2018/09/30
Shipped:
Received: 2018/10/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chlorobenzenes in MM5 Trains (EPA M0010)	GC/MS	5792998	2018/10/19	2018/10/29	Fan (Carrie) Jiang
Chlorophenols in MM5 Trains (EPA M0010)	GC/MS	5793003	2018/10/19	2018/11/07	Fan (Carrie) Jiang
Dioxins/Furans in Air (Method 23)	HRMS/MS	5819589	2018/10/19	2018/11/04	Owen Cosby
PAH's in MM5 SamplingTrains (CARB429mod)	GC/MS	5792973	2018/10/19	2018/10/31	Fan (Carrie) Jiang
PCBs in a Sampling Train (1668Amod)	HRMS/MS	5793011	2018/10/19	2018/11/06	Cathy Xu

Maxxam ID: HZP290
Sample ID: SVOC T2
Matrix: Stack Sampling Train

Collected: 2018/10/01
Shipped:
Received: 2018/10/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chlorobenzenes in MM5 Trains (EPA M0010)	GC/MS	5792998	2018/10/19	2018/10/29	Fan (Carrie) Jiang
Chlorophenols in MM5 Trains (EPA M0010)	GC/MS	5793003	2018/10/19	2018/11/07	Fan (Carrie) Jiang
Dioxins/Furans in Air (Method 23)	HRMS/MS	5819589	2018/10/19	2018/11/04	Owen Cosby
PAH's in MM5 SamplingTrains (CARB429mod)	GC/MS	5792973	2018/10/19	2018/10/31	Fan (Carrie) Jiang
PCBs in a Sampling Train (1668Amod)	HRMS/MS	5793011	2018/10/19	2018/11/06	Cathy Xu

Maxxam ID: HZP291
Sample ID: SVOC T3
Matrix: Stack Sampling Train

Collected: 2018/10/02
Shipped:
Received: 2018/10/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chlorobenzenes in MM5 Trains (EPA M0010)	GC/MS	5792998	2018/10/19	2018/10/29	Fan (Carrie) Jiang
Chlorophenols in MM5 Trains (EPA M0010)	GC/MS	5793003	2018/10/19	2018/11/07	Fan (Carrie) Jiang
Dioxins/Furans in Air (Method 23)	HRMS/MS	5819589	2018/10/19	2018/11/04	Owen Cosby
PAH's in MM5 SamplingTrains (CARB429mod)	GC/MS	5792973	2018/10/19	2018/11/01	Fan (Carrie) Jiang
PCBs in a Sampling Train (1668Amod)	HRMS/MS	5793011	2018/10/19	2018/11/06	Cathy Xu

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Maxxam Job #: B8Q9027
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GENERAL COMMENTS

Impinger extracted past hold time.

Dibenzo(a,c) anthracene, Triphenylene and Picene : These parameters are not accredited for the submitted matrix. Triphenylene co-elutes with Chrysene and Dibenzo(a,c)anthracene co-elutes with Dibenz(a,h)anthracene. The data reported is the total of the 2 compounds if both are present.

Benzo(b)fluoranthene and Benzo(j)fluoranthene co-elute. The data reported is the total of the 2 compounds if both are present.

D6-Pentachlorophenol surrogate recovery was above the upper control limit. This may represent a high bias in some results.

Sample HZP289 [SVOC T1] : PAH Analysis: Due to high concentrations of some of the target analytes, sample required dilution. Detection limits for those compounds were adjusted accordingly.

Sample HZP290 [SVOC T2] : PAH Analysis: Due to high concentrations of some of the target analytes, sample required dilution. Detection limits for those compounds were adjusted accordingly.

Sample HZP291 [SVOC T3] : PAH Analysis: One of the field spikes recovery is above our criteria. This may be due to sample matrix interference.

PAH Analysis: Due to high concentrations of some of the target analytes, sample required dilution. Detection limits for those compounds were adjusted accordingly.

Results relate only to the items tested.

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Report Date: 2019/03/07

RWDI West Inc
Client Project #: 1804600
Site Location: ST. MARYS
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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5792973	FJI	Spiked Blank	D10-2-Methylnaphthalene	2018/10/31		90	%	50 - 150
			D10-Fluoranthene	2018/10/31		92	%	50 - 150
			D10-Phenanthrene	2018/10/31		94	%	50 - 150
			D12-Benzo(a)anthracene	2018/10/31		106	%	50 - 150
			D12-Benzo(a)pyrene	2018/10/31		76	%	50 - 150
			D12-Benzo(b)fluoranthene	2018/10/31		112	%	50 - 150
			D12-Benzo(ghi)perylene	2018/10/31		114	%	50 - 150
			D12-Benzo(k)fluoranthene	2018/10/31		106	%	50 - 150
			D12-Chrysene	2018/10/31		106	%	50 - 150
			D12-Indeno(1,2,3-cd)pyrene	2018/10/31		114	%	50 - 150
			D12-Perylene	2018/10/31		56	%	50 - 150
			D14-Dibenzo(a,h)anthracene	2018/10/31		114	%	50 - 150
			D8-Acenaphthylene	2018/10/31		86	%	50 - 150
			D8-Naphthalene	2018/10/31		88	%	50 - 150
			Acenaphthene	2018/10/31		90	%	60 - 130
			Acenaphthylene	2018/10/31		90	%	60 - 130
			Anthracene	2018/10/31		73	%	60 - 130
			Benzo(a)anthracene	2018/10/31		108	%	60 - 130
			Benzo(a)pyrene	2018/10/31		83	%	60 - 130
			Benzo(b)fluoranthene	2018/10/31		115	%	60 - 130
			Benzo(g,h,i)perylene	2018/10/31		115	%	60 - 130
			Benzo(k)fluoranthene	2018/10/31		110	%	60 - 130
			Biphenyl	2018/10/31		93	%	60 - 130
			Chrysene	2018/10/31		115	%	60 - 130
			Fluoranthene	2018/10/31		95	%	60 - 130
			Fluorene	2018/10/31		98	%	60 - 130
			Indeno(1,2,3-cd)pyrene	2018/10/31		123	%	60 - 130
			Naphthalene	2018/10/31		100	%	60 - 130
			Phenanthrene	2018/10/31		95	%	60 - 130
			Pyrene	2018/10/31		90	%	60 - 130
5792973	FJI	RPD	Acenaphthene	2018/10/31	0		%	50
			Acenaphthylene	2018/10/31	5.7		%	50
			Anthracene	2018/10/31	3.5		%	50
			Benzo(a)anthracene	2018/10/31	7.2		%	50
			Benzo(a)pyrene	2018/10/31	3.0		%	50
			Benzo(b)fluoranthene	2018/10/31	24		%	50
			Benzo(g,h,i)perylene	2018/10/31	9.1		%	50
			Benzo(k)fluoranthene	2018/10/31	19		%	50
			Biphenyl	2018/10/31	2.7		%	50
			Chrysene	2018/10/31	6.7		%	50
			Fluoranthene	2018/10/31	5.4		%	50
			Fluorene	2018/10/31	5.3		%	50
			Indeno(1,2,3-cd)pyrene	2018/10/31	11		%	50
			Naphthalene	2018/10/31	2.5		%	50
			Phenanthrene	2018/10/31	2.7		%	50
			Pyrene	2018/10/31	5.7		%	50
5792973	FJI	Method Blank	D10-2-Methylnaphthalene	2018/10/31		86	%	50 - 150
			D10-Fluoranthene	2018/10/31		86	%	50 - 150
			D10-Phenanthrene	2018/10/31		88	%	50 - 150
			D12-Benzo(a)anthracene	2018/10/31		98	%	50 - 150
			D12-Benzo(a)pyrene	2018/10/31		80	%	50 - 150
			D12-Benzo(b)fluoranthene	2018/10/31		106	%	50 - 150
			D12-Benzo(ghi)perylene	2018/10/31		108	%	50 - 150

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			D12-Benzo(k)fluoranthene	2018/10/31		102	%	50 - 150
			D12-Chrysene	2018/10/31		102	%	50 - 150
			D12-Indeno(1,2,3-cd)pyrene	2018/10/31		106	%	50 - 150
			D12-Perylene	2018/10/31		84	%	50 - 150
			D14-Dibenzo(a,h)anthracene	2018/10/31		106	%	50 - 150
			D8-Acenaphthylene	2018/10/31		78	%	50 - 150
			D8-Naphthalene	2018/10/31		84	%	50 - 150
			1-Methylnaphthalene	2018/10/31	ND, RDL=0.30		ug	
			1-Methylphenanthrene	2018/10/31	ND, RDL=0.30		ug	
			2-Chloronaphthalene	2018/10/31	ND, RDL=0.30		ug	
			2-Methylanthracene	2018/10/31	ND, RDL=0.30		ug	
			2-Methylnaphthalene	2018/10/31	ND, RDL=0.30		ug	
			3-Methylcholanthrene	2018/10/31	ND, RDL=0.30		ug	
			7,12-Dimethylbenzo(a)anthracene	2018/10/31	ND, RDL=1.2		ug	
			9,10-Dimethylanthracene	2018/10/31	ND, RDL=0.30		ug	
			9-Methylphenanthrene	2018/10/31	ND, RDL=0.30		ug	
			Acenaphthene	2018/10/31	ND, RDL=0.30		ug	
			Acenaphthylene	2018/10/31	ND, RDL=0.30		ug	
			Anthracene	2018/10/31	ND, RDL=0.30		ug	
			Benzo(a)anthracene	2018/10/31	ND, RDL=0.30		ug	
			Benzo(a)fluorene	2018/10/31	ND, RDL=0.30		ug	
			Benzo(a)pyrene	2018/10/31	ND, RDL=0.30		ug	
			Benzo(b)fluoranthene	2018/10/31	ND, RDL=0.30		ug	
			Benzo(b)fluorene	2018/10/31	ND, RDL=0.30		ug	
			Benzo(e)pyrene	2018/10/31	ND, RDL=0.30		ug	
			Benzo(g,h,i)perylene	2018/10/31	ND, RDL=0.30		ug	
			Benzo(k)fluoranthene	2018/10/31	ND, RDL=0.30		ug	
			Biphenyl	2018/10/31	ND, RDL=0.30		ug	
			Chrysene	2018/10/31	ND, RDL=0.30		ug	
			Coronene	2018/10/31	ND, RDL=0.30		ug	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Dibenzo(a,c)anthracene	2018/10/31	ND, RDL=0.30		ug	
			Fluoranthene	2018/10/31	ND, RDL=0.30		ug	
			Fluorene	2018/10/31	ND, RDL=0.30		ug	
			Indeno(1,2,3-cd)pyrene	2018/10/31	ND, RDL=0.30		ug	
			m-Terphenyl	2018/10/31	ND, RDL=0.30		ug	
			Naphthalene	2018/10/31	ND, RDL=0.30		ug	
			o-Terphenyl	2018/10/31	ND, RDL=0.30		ug	
			Perylene	2018/10/31	ND, RDL=0.30		ug	
			Phenanthrene	2018/10/31	ND, RDL=0.30		ug	
			Picene	2018/10/31	ND, RDL=0.30		ug	
			p-Terphenyl	2018/10/31	ND, RDL=0.30		ug	
			Pyrene	2018/10/31	ND, RDL=0.30		ug	
			Tetralin	2018/10/31	ND, RDL=0.30		ug	
			Triphenylene	2018/10/31	ND, RDL=0.30		ug	
5792998	FJI	Spiked Blank	1,2,3,4-Tetrachlorobenzene	2018/10/29		81	%	40 - 130
			1,2,3,5+1,2,4,5-Tetrachlorobenzene	2018/10/29		41	%	40 - 130
			1,2,3-Trichlorobenzene	2018/10/29		80	%	40 - 130
			1,2,4-Trichlorobenzene	2018/10/29		84	%	40 - 130
			1,2-Dichlorobenzene	2018/10/29		64	%	40 - 130
			1,3,5-Trichlorobenzene	2018/10/29		85	%	40 - 130
			1,3-Dichlorobenzene	2018/10/29		54	%	40 - 130
			1,4-Dichlorobenzene	2018/10/29		74	%	40 - 130
			13C6-Hexachlorobenzene	2018/10/29		79	%	30 - 130
			2H3-1,2,4-Trichlorobenzene	2018/10/29		79	%	30 - 130
			2H4-1,3-Dichlorobenzene	2018/10/29		62	%	30 - 130
			Hexachlorobenzene	2018/10/29		82	%	40 - 130
			Pentachlorobenzene	2018/10/29		87	%	40 - 130
5792998	FJI	RPD	1,2,3,4-Tetrachlorobenzene	2018/10/29	12		%	50
			1,2,3,5+1,2,4,5-Tetrachlorobenzene	2018/10/29	16		%	50
			1,2,3-Trichlorobenzene	2018/10/29	18		%	50
			1,2,4-Trichlorobenzene	2018/10/29	21		%	50
			1,2-Dichlorobenzene	2018/10/29	31		%	50
			1,3,5-Trichlorobenzene	2018/10/29	18		%	50
			1,3-Dichlorobenzene	2018/10/29	26		%	50
			1,4-Dichlorobenzene	2018/10/29	35		%	50
			Hexachlorobenzene	2018/10/29	8.6		%	50
			Pentachlorobenzene	2018/10/29	8.5		%	50
5792998	FJI	Method Blank	1,2,3,4-Tetrachlorobenzene	2018/10/29	ND, RDL=0.30		ug	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,5+1,2,4,5-Tetrachlorobenzene	2018/10/29	ND, RDL=0.30		ug	
			1,2,3-Trichlorobenzene	2018/10/29	ND, RDL=0.30		ug	
			1,2,4-Trichlorobenzene	2018/10/29	ND, RDL=0.30		ug	
			1,2-Dichlorobenzene	2018/10/29	ND, RDL=0.30		ug	
			1,3,5-Trichlorobenzene	2018/10/29	ND, RDL=0.30		ug	
			1,3-Dichlorobenzene	2018/10/29	ND, RDL=0.30		ug	
			1,4-Dichlorobenzene	2018/10/29	ND, RDL=0.30		ug	
			13C6-Hexachlorobenzene	2018/10/29		82	%	30 - 130
			2H3-1,2,4-Trichlorobenzene	2018/10/29		87	%	30 - 130
			2H4-1,3-Dichlorobenzene	2018/10/29		70	%	30 - 130
			Hexachlorobenzene	2018/10/29	ND, RDL=0.30		ug	
			Pentachlorobenzene	2018/10/29	ND, RDL=0.30		ug	
5793003	FJI	Spiked Blank	2,3,4,5-Tetrachlorophenol	2018/11/06		96	%	22 - 134
			2,3,4-Trichlorophenol	2018/11/06		107	%	22 - 134
			2,3,5-Trichlorophenol	2018/11/06		101	%	22 - 134
			2,4 + 2,5-Dichlorophenol	2018/11/06		89	%	22 - 134
			2,4,6-Trichlorophenol	2018/11/06		104	%	22 - 134
			2,6-Dichlorophenol	2018/11/06		97	%	22 - 134
			2-Chlorophenol	2018/11/06		99	%	22 - 134
			3,4,5-Trichlorophenol	2018/11/06		105	%	22 - 134
			3,4-Dichlorophenol	2018/11/06		107	%	22 - 134
			3,5-Dichlorophenol	2018/11/06		97	%	22 - 134
			4-Chlorophenol	2018/11/06		127	%	22 - 134
			D3-2,4-Dichlorophenol	2018/11/06		107	%	20 - 130
			D6-Pentachlorophenol	2018/11/06		144 (1)	%	20 - 130
			Pentachlorophenol	2018/11/06		109	%	22 - 134
			2,3,4,6-Tetrachlorophenol	2018/11/06		105	%	22 - 134
			2,3,5,6-Tetrachlorophenol	2018/11/06		109	%	22 - 134
			2,3,6-Trichlorophenol	2018/11/06		105	%	22 - 134
			2,3-Dichlorophenol	2018/11/06		102	%	22 - 134
			2,4,5-Trichlorophenol	2018/11/06		106	%	22 - 134
			3-Chlorophenol	2018/11/06		96	%	22 - 134
5793003	FJI	RPD	2,3,4,5-Tetrachlorophenol	2018/11/06	16		%	50
			2,3,4-Trichlorophenol	2018/11/06	2.6		%	50
			2,3,5-Trichlorophenol	2018/11/06	6.4		%	50
			2,4 + 2,5-Dichlorophenol	2018/11/06	2.2		%	50
			2,4,6-Trichlorophenol	2018/11/06	1.7		%	50
			2,6-Dichlorophenol	2018/11/06	3.8		%	50
			2-Chlorophenol	2018/11/06	7.3		%	50
			3,4,5-Trichlorophenol	2018/11/06	6.4		%	50
			3,4-Dichlorophenol	2018/11/06	2.7		%	50
			3,5-Dichlorophenol	2018/11/06	3.1		%	50
			4-Chlorophenol	2018/11/06	0.78		%	50
			Pentachlorophenol	2018/11/06	19		%	50

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			2,3,4,6-Tetrachlorophenol	2018/11/06	8.5		%	50
			2,3,5,6-Tetrachlorophenol	2018/11/06	11		%	50
			2,3,6-Trichlorophenol	2018/11/06	1.4		%	50
			2,3-Dichlorophenol	2018/11/06	2.3		%	50
			2,4,5-Trichlorophenol	2018/11/06	5.3		%	50
			3-Chlorophenol	2018/11/06	3.6		%	50
5793003	FJI	Method Blank	2,3,4,5-Tetrachlorophenol	2018/11/06	ND, RDL=0.30		ug	
			2,3,4-Trichlorophenol	2018/11/06	ND, RDL=0.30		ug	
			2,3,5-Trichlorophenol	2018/11/06	ND, RDL=0.30		ug	
			2,4 + 2,5-Dichlorophenol	2018/11/06	ND, RDL=0.30		ug	
			2,4,6-Trichlorophenol	2018/11/06	ND, RDL=0.30		ug	
			2,6-Dichlorophenol	2018/11/06	ND, RDL=0.30		ug	
			2-Chlorophenol	2018/11/06	ND, RDL=0.30		ug	
			3,4,5-Trichlorophenol	2018/11/06	ND, RDL=0.30		ug	
			3,4-Dichlorophenol	2018/11/06	ND, RDL=0.30		ug	
			3,5-Dichlorophenol	2018/11/06	ND, RDL=0.30		ug	
			4-Chlorophenol	2018/11/06	ND, RDL=0.30		ug	
			D3-2,4-Dichlorophenol	2018/11/06		105	%	20 - 130
			D6-Pentachlorophenol	2018/11/06		162 (1)	%	20 - 130
			Pentachlorophenol	2018/11/06	ND, RDL=0.30		ug	
			2,3,4,6-Tetrachlorophenol	2018/11/06	ND, RDL=0.30		ug	
			2,3,5,6-Tetrachlorophenol	2018/11/06	ND, RDL=0.30		ug	
			2,3,6-Trichlorophenol	2018/11/06	ND, RDL=0.30		ug	
			2,3-Dichlorophenol	2018/11/06	ND, RDL=0.30		ug	
			2,4,5-Trichlorophenol	2018/11/06	ND, RDL=0.30		ug	
			3-Chlorophenol	2018/11/06	ND, RDL=0.30		ug	
5793011	CXU	Spiked Blank	C13-233'44'55'-HeptaCB-(189)	2018/11/06		102	%	30 - 140
			C13-233'44'5-HexaCB-(156)	2018/11/06		95	%	30 - 140
			C13-233'44'5'-HexaCB-(157)	2018/11/06		95	%	30 - 140
			C13-233'44'-PentaCB-(105)	2018/11/06		104	%	30 - 140
			C13-23'44'55'-HexaCB-(167)	2018/11/06		94	%	30 - 140
			C13-2344'5-PentaCB-(114)	2018/11/06		98	%	30 - 140
			C13-23'44'5-PentaCB-(118)	2018/11/06		105	%	30 - 140
			C13-2'344'5-PentaCB-(123)	2018/11/06		102	%	30 - 140
			C13-33'44'55'-HexaCB-(169)	2018/11/06		78	%	30 - 140
			C13-33'44'5-PentaCB-(126)	2018/11/06		100	%	30 - 140

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-33'44'-TetraCB-(77)	2018/11/06		91	%	30 - 140
			C13-344'5-TetraCB-(81)	2018/11/06		92	%	30 - 140
			33'44'-TetraCB-(77)	2018/11/06		100	%	50 - 150
			344'5-TetraCB-(81)	2018/11/06		99	%	50 - 150
			233'44'-PentaCB-(105)	2018/11/06		98	%	50 - 150
			2344'5-PentaCB-(114)	2018/11/06		99	%	50 - 150
			23'44'5-PentaCB-(118)	2018/11/06		99	%	50 - 150
			23'44'5'-PentaCB-(123)	2018/11/06		103	%	50 - 150
			33'44'5-PentaCB-(126)	2018/11/06		98	%	50 - 150
			HexaCB-(156)+(157)	2018/11/06		98	%	N/A
			23'44'55'-HexaCB-(167)	2018/11/06		99	%	50 - 150
			33'44'55'-HexaCB-(169)	2018/11/06		104	%	50 - 150
			233'44'55'-HeptaCB-(189)	2018/11/06		102	%	50 - 150
5793011	CXU	RPD	33'44'-TetraCB-(77)	2018/11/06	3.9		%	30
			344'5-TetraCB-(81)	2018/11/06	3.0		%	30
			233'44'-PentaCB-(105)	2018/11/06	6.9		%	30
			2344'5-PentaCB-(114)	2018/11/06	4.9		%	30
			23'44'5-PentaCB-(118)	2018/11/06	4.0		%	30
			23'44'5'-PentaCB-(123)	2018/11/06	1.9		%	30
			33'44'5-PentaCB-(126)	2018/11/06	7.8		%	30
			HexaCB-(156)+(157)	2018/11/06	5.0		%	30
			23'44'55'-HexaCB-(167)	2018/11/06	5.9		%	30
			33'44'55'-HexaCB-(169)	2018/11/06	0.97		%	30
			233'44'55'-HeptaCB-(189)	2018/11/06	4.0		%	30
5793011	CXU	Method Blank	C13-233'44'55'-HeptaCB-(189)	2018/11/06		122	%	30 - 140
			C13-233'44'5-HexaCB-(156)	2018/11/06		108	%	30 - 140
			C13-233'44'5'-HexaCB-(157)	2018/11/06		108	%	30 - 140
			C13-233'44'-PentaCB-(105)	2018/11/06		128	%	30 - 140
			C13-23'44'55'-HexaCB-(167)	2018/11/06		108	%	30 - 140
			C13-2344'5-PentaCB-(114)	2018/11/06		118	%	30 - 140
			C13-23'44'5-PentaCB-(118)	2018/11/06		127	%	30 - 140
			C13-2'344'5-PentaCB-(123)	2018/11/06		125	%	30 - 140
			C13-33'44'55'-HexaCB-(169)	2018/11/06		84	%	30 - 140
			C13-33'44'5-PentaCB-(126)	2018/11/06		121	%	30 - 140
			C13-33'44'-TetraCB-(77)	2018/11/06		105	%	30 - 140
			C13-344'5-TetraCB-(81)	2018/11/06		104	%	30 - 140
			33'44'-TetraCB-(77)	2018/11/06	ND, RDL=0.60		ng	
			344'5-TetraCB-(81)	2018/11/06	ND, RDL=0.60		ng	
			233'44'-PentaCB-(105)	2018/11/06	ND, RDL=0.60		ng	
			2344'5-PentaCB-(114)	2018/11/06	ND, RDL=0.60		ng	
			23'44'5-PentaCB-(118)	2018/11/06	ND, RDL=0.60 (2)		ng	
			23'44'5'-PentaCB-(123)	2018/11/06	ND, RDL=0.60		ng	
			33'44'5-PentaCB-(126)	2018/11/06	ND, RDL=0.60		ng	
			HexaCB-(156)+(157)	2018/11/06	ND, RDL=1.2		ng	

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Maxxam Job #: B8Q9027
Report Date: 2019/03/07

RWDI West Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			23'44'55'-HexaCB-(167)	2018/11/06	ND, RDL=0.60		ng	
			33'44'55'-HexaCB-(169)	2018/11/06	ND, RDL=0.60		ng	
			233'44'55'-HeptaCB-(189)	2018/11/06	ND, RDL=0.60		ng	
5819589	OBC	Spiked Blank	C13-1234678 HeptaCDD	2018/11/04		100	%	25 - 130
			C13-1234678 HeptaCDF	2018/11/04		75	%	25 - 130
			C13-123678 HexaCDD	2018/11/04		81	%	40 - 130
			C13-123678 HexaCDF	2018/11/04		70	%	40 - 130
			C13-12378 PentaCDD	2018/11/04		77	%	40 - 130
			C13-12378 PentaCDF	2018/11/04		74	%	40 - 130
			C13-123789 HexaCDF	2018/11/04		72	%	40 - 130
			C13-2378 TetraCDD	2018/11/04		100	%	40 - 130
			C13-2378 TetraCDF	2018/11/04		79	%	40 - 130
			C13-Octachlorodibenzo-p-Dioxin	2018/11/04		108	%	25 - 130
			2,3,7,8-Tetra CDD	2018/11/04		93	%	80 - 140
			1,2,3,7,8-Penta CDD	2018/11/04		126	%	80 - 140
			1,2,3,4,7,8-Hexa CDD	2018/11/04		110	%	80 - 140
			1,2,3,6,7,8-Hexa CDD	2018/11/04		117	%	80 - 140
			1,2,3,7,8,9-Hexa CDD	2018/11/04		127	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDD	2018/11/04		91	%	80 - 140
			1,2,3,4,6,7,8,9-Octa CDD	2018/11/04		109	%	80 - 140
			2,3,7,8-Tetra CDF	2018/11/04		109	%	80 - 140
			1,2,3,7,8-Penta CDF	2018/11/04		119	%	80 - 140
			2,3,4,7,8-Penta CDF	2018/11/04		116	%	80 - 140
			1,2,3,4,7,8-Hexa CDF	2018/11/04		106	%	80 - 140
			1,2,3,6,7,8-Hexa CDF	2018/11/04		120	%	80 - 140
			2,3,4,6,7,8-Hexa CDF	2018/11/04		124	%	80 - 140
			1,2,3,7,8,9-Hexa CDF	2018/11/04		134	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDF	2018/11/04		112	%	80 - 140
			1,2,3,4,7,8,9-Hepta CDF	2018/11/04		128	%	80 - 140
			1,2,3,4,6,7,8,9-Octa CDF	2018/11/04		97	%	80 - 140
5819589	OBC	RPD	2,3,7,8-Tetra CDD	2018/11/04	2.2		%	20
			1,2,3,7,8-Penta CDD	2018/11/04	1.6		%	20
			1,2,3,4,7,8-Hexa CDD	2018/11/04	0.91		%	20
			1,2,3,6,7,8-Hexa CDD	2018/11/04	9.0		%	20
			1,2,3,7,8,9-Hexa CDD	2018/11/04	2.4		%	20
			1,2,3,4,6,7,8-Hepta CDD	2018/11/04	27 (1)		%	20
			1,2,3,4,6,7,8,9-Octa CDD	2018/11/04	0		%	20
			2,3,7,8-Tetra CDF	2018/11/04	3.7		%	20
			1,2,3,7,8-Penta CDF	2018/11/04	4.9		%	20
			2,3,4,7,8-Penta CDF	2018/11/04	12		%	20
			1,2,3,4,7,8-Hexa CDF	2018/11/04	0		%	20
			1,2,3,6,7,8-Hexa CDF	2018/11/04	7.2		%	20
			2,3,4,6,7,8-Hexa CDF	2018/11/04	2.4		%	20
			1,2,3,7,8,9-Hexa CDF	2018/11/04	6.2 (3)		%	20
			1,2,3,4,6,7,8-Hepta CDF	2018/11/04	0		%	20
			1,2,3,4,7,8,9-Hepta CDF	2018/11/04	5.6		%	20
			1,2,3,4,6,7,8,9-Octa CDF	2018/11/04	0		%	20
5819589	OBC	Method Blank	C13-1234678 HeptaCDD	2018/11/04		78	%	25 - 130
			C13-1234678 HeptaCDF	2018/11/04		66	%	25 - 130
			C13-123678 HexaCDD	2018/11/04		80	%	40 - 130

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Maxxam Job #: B8Q9027
Report Date: 2019/03/07

RWDI West Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-123678 HexaCDF	2018/11/04		68	%	40 - 130
			C13-12378 PentaCDD	2018/11/04		78	%	40 - 130
			C13-12378 PentaCDF	2018/11/04		71	%	40 - 130
			C13-123789 HexaCDF	2018/11/04		71	%	40 - 130
			C13-2378 TetraCDD	2018/11/04		104	%	40 - 130
			C13-2378 TetraCDF	2018/11/04		75	%	40 - 130
			C13-Octachlorodibenzo-p-Dioxin	2018/11/04		99	%	25 - 130
			2,3,7,8-Tetra CDD	2018/11/04	ND, EDL=19		pg	
			1,2,3,7,8-Penta CDD	2018/11/04	ND, EDL=12		pg	
			1,2,3,4,7,8-Hexa CDD	2018/11/04	ND, EDL=7.2		pg	
			1,2,3,6,7,8-Hexa CDD	2018/11/04	ND, EDL=7.0		pg	
			1,2,3,7,8,9-Hexa CDD	2018/11/04	ND, EDL=6.6		pg	
			1,2,3,4,6,7,8-Hepta CDD	2018/11/04	10.5, EDL=6.4		pg	
			1,2,3,4,6,7,8,9-Octa CDD	2018/11/04	35.0, EDL=7.1		pg	
			Total Tetra CDD	2018/11/04	ND, EDL=69 (2)		pg	
			Total Penta CDD	2018/11/04	ND, EDL=53 (2)		pg	
			Total Hexa CDD	2018/11/04	ND, EDL=150 (2)		pg	
			Total Hepta CDD	2018/11/04	10.5, EDL=6.4		pg	
			2,3,7,8-Tetra CDF	2018/11/04	ND, EDL=11		pg	
			1,2,3,7,8-Penta CDF	2018/11/04	ND, EDL=8.4		pg	
			2,3,4,7,8-Penta CDF	2018/11/04	ND, EDL=8.5		pg	
			1,2,3,4,7,8-Hexa CDF	2018/11/04	ND, EDL=7.8		pg	
			1,2,3,6,7,8-Hexa CDF	2018/11/04	ND, EDL=7.7		pg	
			2,3,4,6,7,8-Hexa CDF	2018/11/04	ND, EDL=8.5		pg	
			1,2,3,7,8,9-Hexa CDF	2018/11/04	11.5, EDL=9.7		pg	
			1,2,3,4,6,7,8-Hepta CDF	2018/11/04	7.8, EDL=6.3		pg	
			1,2,3,4,7,8,9-Hepta CDF	2018/11/04	12.7, EDL=8.3		pg	
			1,2,3,4,6,7,8,9-Octa CDF	2018/11/04	27.0, EDL=6.1		pg	
			Total Tetra CDF	2018/11/04	ND, EDL=11		pg	
			Total Penta CDF	2018/11/04	ND, EDL=8.4		pg	

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Total Hexa CDF	2018/11/04	11.5, EDL=8.4		pg	
			Total Hepta CDF	2018/11/04	20.5, EDL=7.2		pg	

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

(3) Recovery exceeds method criteria

Maxxam Job #: B8Q9027
Report Date: 2019/03/07

RWDI West Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Cathy Xu, Scientific Specialist, Ultra Trace Analysis, HRMS

Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

CHARTERED
Rodney A. Major
CHEMIST

Rodney Major, Manager Organic Processing Lab

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Chain of Custody Form - Source

B8Q9027 (SVOC) B8Q5571 · (MS/M29/M26(M)/CTM027/M201A)
B8Q5238 (VOST)

Maxxam

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CAM FCD-01303 /2 Page ____ of ____

ANALYSIS REQUESTED

CLIENT INFORMATION SECTION

Company Name: RWDI
Project Manager: Kirk Easto
e-mail: kirk.easto@rwdi.com
Address: Guelph, ON
Phone: 519-823-1311 Fax: 519-823-1316
Sampled by: Kirk Easto

MAXXAM use only	Field Sample ID	# Bottles	Collection Date	Collection Time	Initial Impinger Charge Volumes (mL)*	SVOC ENV/CAN 1/RM/2	US EPA M29	US EPA M26 HCl/NH3	Method 30 VOC's	US EPA M201A						
	T1-Baseline -SVOC (6 pieces)	6	Sept 30			x										
	T2-Baseline -SVOC (6 pieces)	6	Oct 1			x										
	T3-Baseline -SVOC (6 pieces)	6	Oct 2			x										
	T1-Baseline - M29 (7 pieces)	7	Sept 30				x									
	T2-Baseline - M29 (7 pieces)	7	Oct 1				x									
	T3-Baseline - M29 (7 pieces)	7	Oct 2				x									
	T1/T2/T3-Baseline -M26 (3 bottle)	3	09/30-10/032		2 * 15 ml			x								
	T1/T2/T3-Baseline -VOST (3 pairs)	3	09/30-10/032						X							
	T1-Baseline - PM10 (4pieces)	4	Sept 30							x						
	T2-Baseline - PM10 (4pieces)	4	Oct 1							x						
	T3-Baseline - PM10 (4pieces)	4	Oct 2							x						

TAT Requirement

- STD 10 Business day ☑
- Rush 5 Business day ☐
- Rush 2 Business day ☐
- Rush 1 Business day ☐
- Other (specify):

PROJECT INFORMATION

Project #: 1804600
Name: St. Marys
PO #: 1804600
Maxxam Quote #:
Maxxam Contact: Clayton Johnson

REPORTING REQUIREMENTS

SSAS Audit samples ☐
Summary Report only ☐
Summary Report & ☐
Raw Data Package **
** additional cost may apply

PROJECT SPECIFIC COMMENTS

See attached list for parameter lists

* Initial Impinger charge volumes are required before the following analysis can be started: Method 26, CTM-027 & Method 8

Client Signature: [signature]
Affilitation: Oct 6 2018
Date/Time:

Received by: FIDELE NTAMWEMEZI
Affilitation: [signature]
Date/Time: 2018/10/06 10:30

Method 23 / TO9A

2005 WHO ☐
1989 NATO TEF ☐
1998 WHO ☐

TEF x DL ☐
TEF x 0 DL ☐
TEF x 0.5 DL ☐

8.5/8.9/9.0
20.6/20.4/20.3

B8Q9027 (SVOC)

Dioxins, Furans and Dioxin-like PCBs ✓

2,3,7,8-Tetrachlorodibenzo-p-dioxin [2,3,7,8-TCDD]
1,2,3,7,8-Pentachlorodibenzo-p-dioxin [1,2,3,7,8-PeCDD]
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin [1,2,3,4,7,8-HxCDD]
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin [1,2,3,6,7,8-HxCDD]
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin [1,2,3,7,8,9-HxCDD]
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin [1,2,3,4,6,7,8-HpCDD]
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin [1,2,3,4,6,7,8,9-OCDD]
2,3,7,8-Tetrachlorodibenzofuran [2,3,7,8-TCDF]
2,3,4,7,8-Pentachlorodibenzofuran [2,3,4,7,8-PeCDF]
1,2,3,7,8-Pentachlorodibenzofuran [1,2,3,7,8-PeCDF]
1,2,3,4,7,8-Hexachlorodibenzofuran [1,2,3,4,7,8-HxCDF]
1,2,3,6,7,8-Hexachlorodibenzofuran [1,2,3,6,7,8-HxCDF]
1,2,3,7,8,9-Hexachlorodibenzofuran [1,2,3,7,8,9-HxCDF]
2,3,4,6,7,8-Hexachlorodibenzofuran [2,3,4,6,7,8-HxCDF]
1,2,3,4,6,7,8-Heptachlorodibenzofuran [1,2,3,4,6,7,8-HpCDF]
1,2,3,4,7,8,9-Heptachlorodibenzofuran [1,2,3,4,7,8,9-HpCDF]
1,2,3,4,6,7,8,9-Octachlorodibenzofuran [1,2,3,4,6,7,8,9-OCDF]

3,3',4,4'-Tetrachlorobiphenyl [3,3',4,4'-tetraCB (PCB 77)] ✓
3,4,4',5- Tetrachlorobiphenyl [3,4,4',5-tetraCB (PCB 81)]
3,3',4,4',5- Pentachlorobiphenyl (PCB 126) [3,3',4,4',5-pentaCB (PCB 126)]
3,3',4,4',5,5'- Hexachlorobiphenyl [3,3',4,4',5,5'-hexaCB (PCB 169)]
2,3,3',4,4'- Pentachlorobiphenyl [2,3,3',4,4'-pentaCB (PCB 105)]
2,3,4,4',5- Pentachlorobiphenyl [2,3,4,4',5-pentaCB (PCB 114)]
2,3',4,4',5- Pentachlorobiphenyl [2,3',4,4',5-pentaCB (PCB 118)]
2',3,4,4',5- Pentachlorobiphenyl [2',3,4,4',5-pentaCB (PCB 123)]
2,3,3',4,4',5- Hexachlorobiphenyl [2,3,3',4,4',5-hexaCB (PCB 156)]
2,3,3',4,4',5'- Hexachlorobiphenyl [2,3,3',4,4',5'-hexaCB (PCB 157)]
2,3',4,4',5,5'- Hexachlorobiphenyl [2,3',4,4',5,5'-hexaCB (PCB 167)]
2,3,3',4,4',5,5'- Heptachlorobiphenyl [2,3,3',4,4',5,5'-heptaCB (PCB 189)]

Polycyclic Organic Matter: ✓
Acenaphthylene
Acenaphthene
Anthracene
Benzo(a)anthracene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(a)fluorene
Benzo(b)fluorene
Benzo(ghi)perylene
Benzo(a)pyrene
Benzo(e)pyrene
2-Chloronaphthalene
Chrysene
Coronene
Dibenzo(a,c)anthracene
9,10-Dimethylanthracene
7,12-Dimethylbenzo(a)anthracene

FIDELE NTAMWEMEZI 8.5/8.9/9.0
Fidele Ntamwemezi 20.6/20.4/20.3
2018/10/06
10:30

B8Q9027(SVOC)

Fluoranthene
Fluorene
Indeno(1,2,3-cd)pyrene
2-Methylanthracene
3-Methylcholanthrene
1-Methylnaphthalene
2-Methylnaphthalene
1-Methylphenanthrene
9-Methylphenanthrene
Naphthalene
Perylene
Phenanthrene
Picene
Pyrene
Tetralin
Triphenylene

Chlorinated Organics ✓

total dichlorobenzenes
total trichlorobenzenes (1,3,5-; 1,2,3-; 1,2,4-)
total tetrachlorobenzenes (1,2,4,5-; 1,2,3,5-)
pentachlorobenzene
hexachlorobenzene
total dichlorophenols (2,3-; 2,4-; and 2,6-)
total trichlorophenols (2,3,4-; 2,4,5-; 2,4,6-; 3,4,5-)
total tetrachlorophenols (2,3,4,6-;2,3,5,6)
total pentachlorophenols

FIDELE NTAMWEMEZI
Fidele Ntamwemezi
2018/10/06
10:30

8.5/8.9/9.0
20.6/20.4/20.3

B8Q9027 (SVOC)

B8Q5571 (M5/M29/M26(M)/CTM027/M201A)

RWDI	B8O3742	Pall			18072358	0.45390
	HUA110-01	90mm Quartz			18072359	0.45930
		p/n 7203			18072360	0.45990
		lot# 20531			18072361	0.45810
					18072362	0.45565
					18072363	0.45625
					18072364	0.45800
					18072365	0.45790
					18072366	0.46280
					18072367	0.46005
					18072368	0.46365
					18072369	0.46005
					18072370	0.45730
					18072371	0.45940
					18072372	0.45655

RWDI	B8O3742	Pall			18081617	0.45850
	HUA110-01	90mm Quartx			18081618	0.45860
		p/n 7203			18081619	0.46085
		lot# 20531			18081620	0.45840
					18081621	0.45955

R.Patel Rai Patel 2018/10/09 08:30

23/23/22

~~20. 20.6/20.4/20.3~~

FNL 2018/10/09

B8Q9027 (SVOC)
B8Q5571 (M5/M29/M26(M)/CTM027/M201A)

For
Clayton Johnson
dropped of samples
Saturday for RWD1
There were not
included

FIDELE NTAMWEMEZI 2018/10/09
08:30

23/23/22

Maxxam
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Your Project #:
Site#: MEDIA PREP
Site Location: ST MARY'S BOWMANVILLE

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/12/11
Report #: R5521380
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8U9150
Received: 2018/11/20, 09:30

Sample Matrix: Air Sampling Media
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Dioxins/Furans in Air (Method 23)	1	2018/11/28	2018/11/29	BRL SOP-00404	EPA M23/23A m
PAH's in MM5 SamplingTrains (CARB429mod)	1	2018/11/28	2018/11/30	BRL SOP-00201	CARB429(ARBM1,M2)mod
VOST EPA5041A, 8260C for 0030, 0031	1	N/A	2018/11/30	BRL SOP-00302	EPA5041A, 8260C

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769
==

Your Project #:
Site#: MEDIA PREP
Site Location: ST MARY'S BOWMANVILLE

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/12/11
Report #: R5521380
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8U9150

Received: 2018/11/20, 09:30

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B8U9150
Report Date: 2018/12/11

RWDI Air Inc
Client Project #:
Site Location: ST MARY'S BOWMANVILLE

SEMI-VOLATILE ORGANICS BY GC-MS (AIR SAMPLING MEDIA)

Maxxam ID		IJR365			
Sampling Date					
	UNITS	TRAIN PROOF #1-4	RDL	MDL	QC Batch
1-Methylnaphthalene	ug	ND	0.15	0.15	5860552
1-Methylphenanthrene	ug	ND	0.15	0.15	5860552
2-Chloronaphthalene	ug	ND	0.15	0.15	5860552
2-Methylanthracene	ug	ND	0.15	0.15	5860552
2-Methylnaphthalene	ug	ND	0.15	0.030	5860552
3-Methylcholanthrene	ug	ND	0.15	0.15	5860552
7,12-Dimethylbenzo(a)anthracene	ug	ND	0.60	0.15	5860552
9,10-Dimethylanthracene	ug	ND	0.15	0.15	5860552
Acenaphthene	ug	ND	0.15	0.030	5860552
Acenaphthylene	ug	ND	0.15	0.030	5860552
Anthracene	ug	ND	0.15	0.030	5860552
Benzo(a)anthracene	ug	ND	0.15	0.030	5860552
Benzo(a)fluorene	ug	ND	0.15	0.15	5860552
Benzo(a)pyrene	ug	ND	0.15	0.030	5860552
Benzo(b)Anthracene	ug	ND	0.15	0.030	5860552
Benzo(b)fluoranthene	ug	ND	0.15	0.030	5860552
Benzo(b)fluorene	ug	ND	0.15	0.15	5860552
Benzo(e)pyrene	ug	ND	0.15	0.15	5860552
Benzo(g,h,i)perylene	ug	ND	0.15	0.030	5860552
Benzo(k)fluoranthene	ug	ND	0.15	0.030	5860552
Biphenyl	ug	ND	0.15	0.15	5860552
Chrysene	ug	ND	0.15	0.030	5860552
Coronene	ug	ND	0.15	0.15	5860552
Dibenz(a,h)anthracene	ug	ND	0.15	0.030	5860552
Dibenzo(a,c)anthracene	ug	ND	0.15	0.030	5860552
Dibenzo(a,e)pyrene	ug	ND	0.15	0.15	5860552
Fluoranthene	ug	ND	0.15	0.030	5860552
Fluorene	ug	ND	0.15	0.030	5860552
Indeno(1,2,3-cd)pyrene	ug	ND	0.15	0.030	5860552
m-Terphenyl	ug	ND	0.15	0.15	5860552
Naphthalene	ug	ND	0.15	0.15	5860552
o-Terphenyl	ug	ND	0.15	0.15	5860552
Perylene	ug	ND	0.15	0.15	5860552
Phenanthrene	ug	ND	0.15	0.030	5860552
Picene	ug	ND	0.15	0.030	5860552
p-Terphenyl	ug	ND	0.15	0.15	5860552

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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SEMI-VOLATILE ORGANICS BY GC-MS (AIR SAMPLING MEDIA)

Maxxam ID		IJR365			
Sampling Date					
	UNITS	**TRAIN PROOF #1-4**	**RDL**	**MDL**	**QC Batch**
Pyrene	ug	ND	0.15	0.030	5860552
Quinoline	ug	ND	0.15	0.15	5860552
Tetralin	ug	ND	0.15	0.15	5860552
Triphenylene	ug	ND	0.15	0.030	5860552
Surrogate Recovery (%)					
D10-2-Methylnaphthalene	%	76			5860552
D10-Fluoranthene	%	76			5860552
D10-Phenanthrene	%	76			5860552
D12-Benzo(a)anthracene	%	98			5860552
D12-Benzo(a)pyrene	%	92			5860552
D12-Benzo(b)fluoranthene	%	100			5860552
D12-Benzo(ghi)perylene	%	100			5860552
D12-Benzo(k)fluoranthene	%	90			5860552
D12-Chrysene	%	92			5860552
D12-Indeno(1,2,3-cd)pyrene	%	108			5860552
D12-Perylene	%	90			5860552
D14-Dibenzo(a,h)anthracene	%	104			5860552
D8-Acenaphthylene	%	72			5860552
D8-Naphthalene	%	74			5860552

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Maxxam Job #: B8U9150
Report Date: 2018/12/11

RWDI Air Inc
Client Project #:
Site Location: ST MARY'S BOWMANVILLE

VOLATILE ORGANICS BY GC/MS (AIR SAMPLING MEDIA)

Maxxam ID		IIK883			
Sampling Date		2018/11/20 10:17			
	UNITS	VOST PROOF	RDL	MDL	QC Batch
Dichlorodifluoromethane (FREON 12)	ug	ND	0.020	0.020	5865052
Chloromethane	ug	ND	0.015	0.015	5865052
Vinyl Chloride	ug	ND	0.013	0.013	5865052
Bromomethane	ug	ND	0.015	0.015	5865052
Chloroethane	ug	ND	0.0090	0.0090	5865052
Trichlorofluoromethane (FREON 11)	ug	ND	0.010	0.010	5865052
Acetone (2-Propanone)	ug	ND	0.045	0.025	5865052
1,1-Dichloroethylene	ug	ND	0.011	0.011	5865052
Iodomethane	ug	ND	0.015	0.015	5865052
Carbon Disulfide	ug	ND	0.026	0.026	5865052
Methylene Chloride(Dichloromethane)	ug	ND	0.019	0.020	5865052
1,1-Dichloroethane	ug	ND	0.012	0.012	5865052
trans-1,2-Dichloroethylene	ug	ND	0.010	0.010	5865052
cis-1,2-Dichloroethylene	ug	ND	0.010	0.010	5865052
Chloroform	ug	ND	0.011	0.011	5865052
1,2-Dichloroethane	ug	ND	0.0070	0.0070	5865052
Methyl Ethyl Ketone (2-Butanone)	ug	ND	0.036	0.036	5865052
1,1,1-Trichloroethane	ug	ND	0.014	0.014	5865052
Carbon Tetrachloride	ug	ND	0.016	0.016	5865052
Benzene	ug	ND	0.0090	0.0090	5865052
1,1,2-Trichloroethane	ug	ND	0.016	0.016	5865052
1,2-Dichloropropane	ug	ND	0.011	0.011	5865052
Trichloroethylene	ug	ND	0.011	0.011	5865052
Dibromomethane	ug	ND	0.010	0.010	5865052
Bromodichloromethane	ug	ND	0.011	0.011	5865052
cis-1,3-Dichloropropene	ug	ND	0.010	0.010	5865052
trans-1,3-Dichloropropene	ug	ND	0.0070	0.0070	5865052
Dibromochloromethane	ug	ND	0.0090	0.0090	5865052
Methyl Isobutyl Ketone	ug	ND	0.019	0.019	5865052
Methyl Butyl Ketone (2-Hexanone)	ug	ND	0.031	0.031	5865052
Toluene	ug	ND	0.014	0.014	5865052
Ethylene Dibromide	ug	ND	0.010	0.010	5865052
Tetrachloroethylene	ug	ND	0.018	0.018	5865052
Chlorobenzene	ug	ND	0.011	0.011	5865052
1,1,1,2-Tetrachloroethane	ug	ND	0.010	0.010	5865052
Ethylbenzene	ug	ND	0.014	0.014	5865052

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

VOLATILE ORGANICS BY GC/MS (AIR SAMPLING MEDIA)

Maxxam ID		IIK883			
Sampling Date		2018/11/20 10:17			
	UNITS	**VOST PROOF**	**RDL**	**MDL**	**QC Batch**
m / p-Xylene	ug	ND	0.015	0.015	5865052
Styrene	ug	ND	0.012	0.012	5865052
o-Xylene	ug	ND	0.015	0.015	5865052
Bromoform	ug	ND	0.014	0.014	5865052
1,1,2,2-Tetrachloroethane	ug	ND	0.014	0.014	5865052
1,2,3-Trichloropropane	ug	ND	0.015	0.015	5865052
1,3-Dichlorobenzene	ug	ND	0.020	0.020	5865052
1,4-Dichlorobenzene	ug	ND	0.020	0.020	5865052
1,2-Dichlorobenzene	ug	ND	0.020	0.020	5865052
Surrogate Recovery (%)					
Bromofluorobenzene	%	104			5865052
D10-Ethylbenzene (FS)	%	93			5865052
D4-1,2-Dichloroethane	%	109			5865052
D8-Toluene	%	98			5865052

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B8U9150
Report Date: 2018/12/11

RWDI Air Inc
Client Project #:
Site Location: ST MARY'S BOWMANVILLE

DIOXINS AND FURANS BY HRMS (AIR SAMPLING MEDIA)

Maxxam ID		IJR365							
Sampling Date						TOXIC EQUIVALENCY		# of	
	UNITS	TRAIN PROOF #1-4	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	ND	1.3	10	2.0	1.00	1.30		5860304
1,2,3,7,8-Penta CDD *	pg	ND	1.2	10	2.0	1.00	1.20		5860304
1,2,3,4,7,8-Hexa CDD *	pg	ND	1.3	10	2.0	0.100	0.130		5860304
1,2,3,6,7,8-Hexa CDD *	pg	ND	1.3	10	2.0	0.100	0.130		5860304
1,2,3,7,8,9-Hexa CDD *	pg	ND	1.2	10	2.0	0.100	0.120		5860304
1,2,3,4,6,7,8-Hepta CDD *	pg	ND	1.3	10	3.0	0.0100	0.0130		5860304
1,2,3,4,6,7,8,9-Octa CDD *	pg	ND	2.0	100	3.0	0.000300	0.000600		5860304
Total Tetra CDD *	pg	ND	1.3	10	N/A			0	5860304
Total Penta CDD *	pg	ND	1.2	10	N/A			0	5860304
Total Hexa CDD *	pg	ND	1.3	10	N/A			0	5860304
Total Hepta CDD *	pg	ND	1.3	10	N/A			0	5860304
2,3,7,8-Tetra CDF **	pg	ND	1.1	10	2.0	0.100	0.110		5860304
1,2,3,7,8-Penta CDF **	pg	ND	1.4	10	2.0	0.0300	0.0420		5860304
2,3,4,7,8-Penta CDF **	pg	ND	1.5	10	2.0	0.300	0.450		5860304
1,2,3,4,7,8-Hexa CDF **	pg	ND	1.3	10	2.0	0.100	0.130		5860304
1,2,3,6,7,8-Hexa CDF **	pg	ND	1.3	10	2.0	0.100	0.130		5860304
2,3,4,6,7,8-Hexa CDF **	pg	ND	1.5	10	2.0	0.100	0.150		5860304
1,2,3,7,8,9-Hexa CDF **	pg	ND	1.5	10	2.0	0.100	0.150		5860304
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	0.99	10	3.0	0.0100	0.00990		5860304
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	1.3	10	2.0	0.0100	0.0130		5860304
1,2,3,4,6,7,8,9-Octa CDF **	pg	ND	1.3	100	5.0	0.000300	0.000390		5860304
Total Tetra CDF **	pg	ND	1.1	10	N/A			0	5860304
Total Penta CDF **	pg	ND	1.4	10	N/A			0	5860304
Total Hexa CDF **	pg	ND	1.4	10	N/A			0	5860304
Total Hepta CDF **	pg	ND	1.1	10	N/A			0	5860304
TOTAL TOXIC EQUIVALENCY	pg						4.08		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	97							5860304

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8U9150
Report Date: 2018/12/11

RWDI Air Inc
Client Project #:
Site Location: ST MARY'S BOWMANVILLE

DIOXINS AND FURANS BY HRMS (AIR SAMPLING MEDIA)

Maxxam ID		IJR365							
Sampling Date						**TOXIC EQUIVALENCY**		# of	
	UNITS	**TRAIN PROOF #1-4**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
C13-1234678 HeptaCDF **	%	97							5860304
C13-123678 HexaCDD *	%	89							5860304
C13-123678 HexaCDF **	%	91							5860304
C13-12378 PentaCDD *	%	83							5860304
C13-12378 PentaCDF **	%	79							5860304
C13-123789 HexaCDF **	%	80							5860304
C13-2378 TetraCDD *	%	99							5860304
C13-2378 TetraCDF **	%	114							5860304
C13-Octachlorodibenzo-p-Dioxin	%	78							5860304

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
** CDF = Chloro Dibenzo-p-Furan
* CDD = Chloro Dibenzo-p-Dioxin

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TEST SUMMARY

Maxxam ID: IIK883
Sample ID: VOST PROOF
Matrix: Air Sampling Media

Collected: 2018/11/20
Shipped: 2018/11/30
Received: 2018/11/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	5865052	N/A	2018/11/30	Yujie Yan

Maxxam ID: IJR365
Sample ID: TRAIN PROOF #1-4
Matrix: Air Sampling Media

Collected:
Shipped: 2018/11/30
Received: 2018/11/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Air (Method 23)	HRMS/MS	5860304	2018/11/28	2018/11/29	Angel Guerrero
PAH's in MM5 SamplingTrains (CARB429mod)	GC/MS	5860552	2018/11/28	2018/11/30	Samantha Clay

Maxxam ID: IJR365 Dup
Sample ID: TRAIN PROOF #1-4
Matrix: Air Sampling Media

Collected:
Shipped: 2018/11/30
Received: 2018/11/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Air (Method 23)	HRMS/MS	5860304	2018/11/28	2018/11/29	Angel Guerrero

GENERAL COMMENTS

Results relate only to the items tested.

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Maxxam Job #: B8U9150
Report Date: 2018/12/11

RWDI Air Inc
Client Project #:
Site Location: ST MARY'S BOWMANVILLE

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5860304	AGU	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2018/11/29	NC		%	20
			1,2,3,7,8-Penta CDD	2018/11/29	NC		%	20
			1,2,3,4,7,8-Hexa CDD	2018/11/29	NC		%	20
			1,2,3,6,7,8-Hexa CDD	2018/11/29	NC		%	20
			1,2,3,7,8,9-Hexa CDD	2018/11/29	NC		%	20
			1,2,3,4,6,7,8-Hepta CDD	2018/11/29	NC		%	20
			1,2,3,4,6,7,8,9-Octa CDD	2018/11/29	NC		%	20
			Total Tetra CDD	2018/11/29	NC		%	20
			Total Penta CDD	2018/11/29	NC		%	20
			Total Hexa CDD	2018/11/29	NC		%	20
			Total Hepta CDD	2018/11/29	NC		%	20
			2,3,7,8-Tetra CDF	2018/11/29	NC		%	20
			1,2,3,7,8-Penta CDF	2018/11/29	NC		%	20
			2,3,4,7,8-Penta CDF	2018/11/29	NC		%	20
			1,2,3,4,7,8-Hexa CDF	2018/11/29	NC		%	20
			1,2,3,6,7,8-Hexa CDF	2018/11/29	NC		%	20
			2,3,4,6,7,8-Hexa CDF	2018/11/29	NC		%	20
			1,2,3,7,8,9-Hexa CDF	2018/11/29	NC		%	20
			1,2,3,4,6,7,8-Hepta CDF	2018/11/29	NC		%	20
			1,2,3,4,7,8,9-Hepta CDF	2018/11/29	NC		%	20
			1,2,3,4,6,7,8,9-Octa CDF	2018/11/29	NC		%	20
			Total Tetra CDF	2018/11/29	NC		%	20
			Total Penta CDF	2018/11/29	NC		%	20
			Total Hexa CDF	2018/11/29	NC		%	20
			Total Hepta CDF	2018/11/29	NC		%	20

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

Maxxam Job #: B8U9150
Report Date: 2018/12/11

RWDI Air Inc
Client Project #:
Site Location: ST MARY'S BOWMANVILLE

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Maureen Smith

Maureen Smith, Supervisor, Volatiles

Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

CHARTERED
Rodney A. Major
CHEMIST

Rodney Major, Manager Organic Processing Lab

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Your Project #: 1804600
Site#: MEDIA PREP
Site Location: ST. MARY'S BOWMANVILLE

Attention: kirk easto
RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/10/18
Report #: R5446065
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8O3742
Received: 2018/09/18, 17:00

Sample Matrix: Air Sampling Media
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Chlorobenzenes in MM5 Trains (EPA M0010)	1	2018/09/24	2018/09/24	BRL SOP-00202	In house (M0010)
Chlorophenols in MM5 Trains (EPA M0010)	1	2018/09/24	2018/09/26	BRL SOP-00204	In house (M0010)
Dioxins/Furans in Air (Method 23)	1	2018/09/24	2018/09/26	BRL SOP-00404	EPA M23/23A m
PAH's in MM5 SamplingTrains (CARB429mod)	1	2018/09/24	2018/09/24	BRL SOP-00201	CARB429(ARBM1,M2)mod
PCBs in a Sampling Train (1668Amod)	1	2018/09/24	2018/09/27	BRL SOP-00408	EPA 1668A m
VOST EPA5041A, 8260C for 0030, 0031	1	N/A	2018/09/27	BRL SOP-00302	EPA5041A, 8260C

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Your Project #: 1804600
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Attention: kirk easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/10/18
Report #: R5446065
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8O3742
Received: 2018/09/18, 17:00

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769
==
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Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

RESULTS OF ANALYSES OF AIR SAMPLING MEDIA

Maxxam ID		HUA161							
Sampling Date		2018/09/18 17:11				**TOXIC EQUIVALENCY**		# of	
	UNITS	**TRAIN PROOF 1-8**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
33'44'-TetraCB-(77)	ng	<0.14	0.14	0.60	N/A	0.00010	0.000014		5748626
344'5-TetraCB-(81)	ng	<0.14	0.14	0.60	N/A	0.00030	0.000042		5748626
233'44'-PentaCB-(105)	ng	0.087	0.043	0.60	N/A	0.000030	0.0000026		5748626
2344'5-PentaCB-(114)	ng	<0.043	0.043	0.60	N/A	0.000030	0.0000013		5748626
23'44'5-PentaCB-(118)	ng	0.16	0.043	0.60	N/A	0.000030	0.0000048		5748626
23'44'5'-PentaCB-(123)	ng	<0.048	0.048	0.60	N/A	0.000030	0.0000014		5748626
33'44'5-PentaCB-(126)	ng	<0.042	0.042	0.60	N/A	0.10	0.0042		5748626
HexaCB-(156)+(157)	ng	<0.096	0.096	1.2	N/A	0.000030	0.0000029		5748626
23'44'55'-HexaCB-(167)	ng	<0.091	0.091	0.60	N/A	0.000030	0.0000027		5748626
33'44'55'-HexaCB-(169)	ng	<0.098	0.098	0.60	N/A	0.030	0.0029		5748626
233'44'55'-HeptaCB-(189)	ng	<0.12	0.12	0.60	N/A	0.000030	0.0000036		5748626
TOTAL TOXIC EQUIVALENCY	ng						0.0072		
Surrogate Recovery (%)									
C13-233'44'55'-HeptaCB-(189)	%	104							5748626
C13-233'44'5-HexaCB-(156)	%	94							5748626
C13-233'44'5'-HexaCB-(157)	%	94							5748626
C13-233'44'-PentaCB-(105)	%	103							5748626
C13-23'44'55'-HexaCB-(167)	%	93							5748626
C13-2344'5-PentaCB-(114)	%	102							5748626
C13-23'44'5-PentaCB-(118)	%	99							5748626
C13-2'344'5-PentaCB-(123)	%	98							5748626
C13-33'44'55'-HexaCB-(169)	%	80							5748626
C13-33'44'5-PentaCB-(126)	%	97							5748626
C13-33'44'-TetraCB-(77)	%	92							5748626
C13-344'5-TetraCB-(81)	%	90							5748626

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

N/A = Not Applicable

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Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

SEMI-VOLATILE ORGANICS BY GC-MS (AIR SAMPLING MEDIA)

Maxxam ID		HUA161			
Sampling Date		2018/09/18 17:11			
	UNITS	**TRAIN PROOF 1-8**	**RDL**	**MDL**	**QC Batch**
1-Methylnaphthalene	ug	<0.30	0.30	0.30	5747447
1-Methylphenanthrene	ug	<0.30	0.30	0.30	5747447
2-Chloronaphthalene	ug	<0.30	0.30	0.30	5747447
2-Methylanthracene	ug	<0.30	0.30	0.30	5747447
2-Methylnaphthalene	ug	<0.30	0.30	0.060	5747447
3-Methylcholanthrene	ug	<0.30	0.30	0.30	5747447
7,12-Dimethylbenzo(a)anthracene	ug	<1.2	1.2	0.30	5747447
9,10-Dimethylanthracene	ug	<0.30	0.30	0.30	5747447
Acenaphthene	ug	<0.30	0.30	0.060	5747447
Acenaphthylene	ug	<0.30	0.30	0.060	5747447
Anthracene	ug	<0.30	0.30	0.060	5747447
Benzo(a)anthracene	ug	<0.30	0.30	0.060	5747447
Benzo(a)fluorene	ug	<0.30	0.30	0.30	5747447
Benzo(a)pyrene	ug	<0.30	0.30	0.060	5747447
Benzo(b)Anthracene	ug	<0.30	0.30	0.060	5747447
Benzo(b)fluoranthene	ug	<0.30	0.30	0.060	5747447
Benzo(b)fluorene	ug	<0.30	0.30	0.30	5747447
Benzo(e)pyrene	ug	<0.30	0.30	0.30	5747447
Benzo(g,h,i)perylene	ug	<0.30	0.30	0.060	5747447
Benzo(k)fluoranthene	ug	<0.30	0.30	0.060	5747447
Biphenyl	ug	<0.30	0.30	0.30	5747447
Chrysene	ug	<0.30	0.30	0.060	5747447
Coronene	ug	<0.30	0.30	0.30	5747447
Dibenz(a,h)anthracene	ug	<0.30	0.30	0.060	5747447
Dibenzo(a,c)anthracene	ug	<0.30	0.30	0.060	5747447
Dibenzo(a,e)pyrene	ug	<0.30	0.30	0.30	5747447
Fluoranthene	ug	<0.30	0.30	0.060	5747447
Fluorene	ug	<0.30	0.30	0.060	5747447
Indeno(1,2,3-cd)pyrene	ug	<0.30	0.30	0.060	5747447
m-Terphenyl	ug	<0.30	0.30	0.30	5747447
Naphthalene	ug	<0.30	0.30	0.30	5747447
o-Terphenyl	ug	<0.30	0.30	0.30	5747447
Perylene	ug	<0.30	0.30	0.30	5747447
Phenanthrene	ug	<0.30	0.30	0.060	5747447
Picene	ug	<0.30	0.30	0.060	5747447

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

SEMI-VOLATILE ORGANICS BY GC-MS (AIR SAMPLING MEDIA)

Maxxam ID		HUA161			
Sampling Date		2018/09/18 17:11			
	UNITS	**TRAIN PROOF 1-8**	**RDL**	**MDL**	**QC Batch**
p-Terphenyl	ug	<0.30	0.30	0.30	5747447
Pyrene	ug	<0.30	0.30	0.060	5747447
Quinoline	ug	<0.30	0.30	0.30	5747447
Tetralin	ug	<0.30	0.30	0.30	5747447
Triphenylene	ug	<0.30	0.30	0.060	5747447
1,2,3,4-Tetrachlorobenzene	ug	<0.30	0.30	0.060	5747460
1,2,3,5+1,2,4,5-Tetrachlorobenzene	ug	<0.30	0.30	0.060	5747460
1,2,3-Trichlorobenzene	ug	<0.30	0.30	0.060	5747460
1,2,4-Trichlorobenzene	ug	<0.30	0.30	0.060	5747460
1,2-Dichlorobenzene	ug	<0.30	0.30	0.060	5747460
1,3,5-Trichlorobenzene	ug	<0.30	0.30	0.060	5747460
1,3-Dichlorobenzene	ug	<0.30	0.30	0.060	5747460
1,4-Dichlorobenzene	ug	<0.30	0.30	0.060	5747460
Hexachlorobenzene	ug	<0.30	0.30	0.060	5747460
Pentachlorobenzene	ug	<0.30	0.30	0.060	5747460
2,3,4,5-Tetrachlorophenol	ug	<0.30	0.30	0.24	5747742
2,3,4,6-Tetrachlorophenol	ug	<0.30	0.30	0.24	5747742
2,3,4-Trichlorophenol	ug	<0.30	0.30	0.24	5747742
2,3,5,6-Tetrachlorophenol	ug	<0.30	0.30	0.24	5747742
2,3,5-Trichlorophenol	ug	<0.30	0.30	0.24	5747742
2,3,6-Trichlorophenol	ug	<0.30	0.30	0.24	5747742
2,3-Dichlorophenol	ug	<0.30	0.30	0.24	5747742
2,4 + 2,5-Dichlorophenol	ug	<0.30	0.30	0.24	5747742
2,4,5-Trichlorophenol	ug	<0.30	0.30	0.24	5747742
2,4,6-Trichlorophenol	ug	<0.30	0.30	0.24	5747742
2,6-Dichlorophenol	ug	<0.30	0.30	0.24	5747742
2-Chlorophenol	ug	<0.30	0.30	0.24	5747742
3,4,5-Trichlorophenol	ug	<0.30	0.30	0.24	5747742
3,4-Dichlorophenol	ug	<0.30	0.30	0.24	5747742
3,5-Dichlorophenol	ug	<0.30	0.30	0.24	5747742
3-Chlorophenol	ug	<0.30	0.30	0.24	5747742
4-Chlorophenol	ug	<0.30	0.30	0.24	5747742
Pentachlorophenol	ug	<0.30	0.30	0.24	5747742
Surrogate Recovery (%)					
13C6-Hexachlorobenzene	%	102			5747460

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

SEMI-VOLATILE ORGANICS BY GC-MS (AIR SAMPLING MEDIA)

Maxxam ID		HUA161			
Sampling Date		2018/09/18 17:11			
	UNITS	**TRAIN PROOF 1-8**	**RDL**	**MDL**	**QC Batch**
2H3-1,2,4-Trichlorobenzene	%	103			5747460
2H4-1,3-Dichlorobenzene	%	98			5747460
D3-2,4-Dichlorophenol	%	88			5747742
D6-Pentachlorophenol	%	98			5747742
D10-2-Methylnaphthalene	%	70			5747447
D10-Fluoranthene	%	70			5747447
D10-Phenanthrene	%	70			5747447
D12-Benzo(a)anthracene	%	82			5747447
D12-Benzo(a)pyrene	%	82			5747447
D12-Benzo(b)fluoranthene	%	88			5747447
D12-Benzo(ghi)perylene	%	84			5747447
D12-Benzo(k)fluoranthene	%	76			5747447
D12-Chrysene	%	80			5747447
D12-Indeno(1,2,3-cd)pyrene	%	82			5747447
D12-Perylene	%	76			5747447
D14-Dibenzo(a,h)anthracene	%	80			5747447
D8-Acenaphthylene	%	68			5747447
D8-Naphthalene	%	68			5747447

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

VOLATILE ORGANICS BY GC/MS (AIR SAMPLING MEDIA)

Maxxam ID		HUA336			
Sampling Date		2018/09/18 17:11			
	UNITS	**VOST PROOF 1-9**	**RDL**	**MDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug	<0.020	0.020	0.020	5754531
Chloromethane	ug	<0.015	0.015	0.015	5754531
Vinyl Chloride	ug	<0.013	0.013	0.013	5754531
Bromomethane	ug	<0.015	0.015	0.015	5754531
Chloroethane	ug	<0.0090	0.0090	0.0090	5754531
Trichlorofluoromethane (FREON 11)	ug	<0.010	0.010	0.010	5754531
Acetone (2-Propanone)	ug	<0.045	0.045	0.025	5754531
1,1-Dichloroethylene	ug	<0.011	0.011	0.011	5754531
Iodomethane	ug	<0.015	0.015	0.015	5754531
Carbon Disulfide	ug	<0.026	0.026	0.026	5754531
Methylene Chloride(Dichloromethane)	ug	<0.019	0.019	0.020	5754531
1,1-Dichloroethane	ug	<0.012	0.012	0.012	5754531
trans-1,2-Dichloroethylene	ug	<0.010	0.010	0.010	5754531
cis-1,2-Dichloroethylene	ug	<0.010	0.010	0.010	5754531
Chloroform	ug	<0.011	0.011	0.011	5754531
1,2-Dichloroethane	ug	<0.0070	0.0070	0.0070	5754531
Methyl Ethyl Ketone (2-Butanone)	ug	<0.036	0.036	0.036	5754531
1,1,1-Trichloroethane	ug	<0.014	0.014	0.014	5754531
Carbon Tetrachloride	ug	<0.016	0.016	0.016	5754531
Benzene	ug	<0.0090	0.0090	0.0090	5754531
1,1,2-Trichloroethane	ug	<0.016	0.016	0.016	5754531
1,2-Dichloropropane	ug	<0.011	0.011	0.011	5754531
Trichloroethylene	ug	<0.011	0.011	0.011	5754531
Dibromomethane	ug	<0.010	0.010	0.010	5754531
Bromodichloromethane	ug	<0.011	0.011	0.011	5754531
cis-1,3-Dichloropropene	ug	<0.010	0.010	0.010	5754531
trans-1,3-Dichloropropene	ug	<0.0070	0.0070	0.0070	5754531
Dibromochloromethane	ug	<0.0090	0.0090	0.0090	5754531
Methyl Isobutyl Ketone	ug	<0.019	0.019	0.019	5754531
Methyl Butyl Ketone (2-Hexanone)	ug	<0.031	0.031	0.031	5754531
Toluene	ug	<0.014	0.014	0.014	5754531
Ethylene Dibromide	ug	<0.010	0.010	0.010	5754531
Tetrachloroethylene	ug	<0.018	0.018	0.018	5754531
Chlorobenzene	ug	<0.011	0.011	0.011	5754531
1,1,1,2-Tetrachloroethane	ug	<0.010	0.010	0.010	5754531

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

VOLATILE ORGANICS BY GC/MS (AIR SAMPLING MEDIA)

Maxxam ID		HUA336			
Sampling Date		2018/09/18 17:11			
	UNITS	**VOST PROOF 1-9**	**RDL**	**MDL**	**QC Batch**
Ethylbenzene	ug	<0.014	0.014	0.014	5754531
m / p-Xylene	ug	<0.015	0.015	0.015	5754531
Styrene	ug	<0.012	0.012	0.012	5754531
o-Xylene	ug	<0.015	0.015	0.015	5754531
Bromoform	ug	<0.014	0.014	0.014	5754531
1,1,2,2-Tetrachloroethane	ug	<0.014	0.014	0.014	5754531
1,2,3-Trichloropropane	ug	<0.015	0.015	0.015	5754531
1,3-Dichlorobenzene	ug	<0.020	0.020	0.020	5754531
1,4-Dichlorobenzene	ug	<0.020	0.020	0.020	5754531
1,2-Dichlorobenzene	ug	<0.020	0.020	0.020	5754531
Surrogate Recovery (%)					
Bromofluorobenzene	%	101			5754531
D10-Ethylbenzene (FS)	%	90			5754531
D4-1,2-Dichloroethane	%	106			5754531
D8-Toluene	%	100			5754531
RDL = Reportable Detection Limit QC Batch = Quality Control Batch					

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Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

DIOXINS AND FURANS BY HRMS (AIR SAMPLING MEDIA)

Maxxam ID		HUA161							
Sampling Date		2018/09/18 17:11				**TOXIC EQUIVALENCY**		# of	
	UNITS	**TRAIN PROOF 1-8**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	<1.1	1.1	10	2.0	1.00	1.10		5748168
1,2,3,7,8-Penta CDD *	pg	<1.1	1.1	10	2.0	1.00	1.10		5748168
1,2,3,4,7,8-Hexa CDD *	pg	<1.0	1.0	10	2.0	0.100	0.100		5748168
1,2,3,6,7,8-Hexa CDD *	pg	<1.0	1.0	10	2.0	0.100	0.100		5748168
1,2,3,7,8,9-Hexa CDD *	pg	<0.96	0.96	10	2.0	0.100	0.0960		5748168
1,2,3,4,6,7,8-Hepta CDD *	pg	<1.1	1.1	10	3.0	0.0100	0.0110		5748168
1,2,3,4,6,7,8,9-Octa CDD *	pg	<1.1	1.1	100	3.0	0.000300	0.000330		5748168
Total Tetra CDD *	pg	<1.1	1.1	10	N/A			0	5748168
Total Penta CDD *	pg	<1.1	1.1	10	N/A			0	5748168
Total Hexa CDD *	pg	<1.0	1.0	10	N/A			0	5748168
Total Hepta CDD *	pg	<1.1	1.1	10	N/A			0	5748168
2,3,7,8-Tetra CDF **	pg	<0.99	0.99	10	2.0	0.100	0.0990		5748168
1,2,3,7,8-Penta CDF **	pg	<1.0	1.0	10	2.0	0.0300	0.0300		5748168
2,3,4,7,8-Penta CDF **	pg	<1.0	1.0	10	2.0	0.300	0.300		5748168
1,2,3,4,7,8-Hexa CDF **	pg	<0.97	0.97	10	2.0	0.100	0.0970		5748168
1,2,3,6,7,8-Hexa CDF **	pg	<0.99	0.99	10	2.0	0.100	0.0990		5748168
2,3,4,6,7,8-Hexa CDF **	pg	<1.0	1.0	10	2.0	0.100	0.100		5748168
1,2,3,7,8,9-Hexa CDF **	pg	<1.2	1.2	10	2.0	0.100	0.120		5748168
1,2,3,4,6,7,8-Hepta CDF **	pg	<0.88	0.88	10	3.0	0.0100	0.00880		5748168
1,2,3,4,7,8,9-Hepta CDF **	pg	<1.2	1.2	10	2.0	0.0100	0.0120		5748168
1,2,3,4,6,7,8,9-Octa CDF **	pg	<0.99	0.99	100	5.0	0.000300	0.000297		5748168
Total Tetra CDF **	pg	<0.99	0.99	10	N/A			0	5748168
Total Penta CDF **	pg	<1.0	1.0	10	N/A			0	5748168
Total Hexa CDF **	pg	<1.0	1.0	10	N/A			0	5748168
Total Hepta CDF **	pg	<1.0	1.0	10	N/A			0	5748168
TOTAL TOXIC EQUIVALENCY	pg						3.37		

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

DIOXINS AND FURANS BY HRMS (AIR SAMPLING MEDIA)

Maxxam ID		HUA161							
Sampling Date		2018/09/18 17:11				**TOXIC EQUIVALENCY**		# of	
	UNITS	**TRAIN PROOF 1-8**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	106							5748168
C13-1234678 HeptaCDF **	%	100							5748168
C13-123678 HexaCDD *	%	77							5748168
C13-123678 HexaCDF **	%	94							5748168
C13-12378 PentaCDD *	%	101							5748168
C13-12378 PentaCDF **	%	102							5748168
C13-2378 TetraCDD *	%	109							5748168
C13-2378 TetraCDF **	%	91							5748168
C13-Octachlorodibenzo-p-Dioxin	%	122							5748168

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

TEST SUMMARY

Maxxam ID: HUA161
Sample ID: TRAIN PROOF 1-8
Matrix: Air Sampling Media

Collected: 2018/09/18
Shipped:
Received: 2018/09/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chlorobenzenes in MM5 Trains (EPA M0010)	GC/MS	5747460	2018/09/24	2018/09/24	Fan (Carrie) Jiang
Chlorophenols in MM5 Trains (EPA M0010)	GC/MS	5747742	2018/09/24	2018/09/26	Fan (Carrie) Jiang
Dioxins/Furans in Air (Method 23)	HRMS/MS	5748168	2018/09/24	2018/09/26	Angel Guerrero
PAH's in MM5 SamplingTrains (CARB429mod)	GC/MS	5747447	2018/09/24	2018/09/24	Fan (Carrie) Jiang
PCBs in a Sampling Train (1668Amod)	HRMS/MS	5748626	2018/09/24	2018/09/27	Cathy Xu

Maxxam ID: HUA161 Dup
Sample ID: TRAIN PROOF 1-8
Matrix: Air Sampling Media

Collected: 2018/09/18
Shipped:
Received: 2018/09/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Air (Method 23)	HRMS/MS	5748168	2018/09/24	2018/09/26	Angel Guerrero
PCBs in a Sampling Train (1668Amod)	HRMS/MS	5748626	2018/10/03	2018/09/27	Cathy Xu

Maxxam ID: HUA336
Sample ID: VOST PROOF 1-9
Matrix: Air Sampling Media

Collected: 2018/09/18
Shipped:
Received: 2018/09/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	5754531	N/A	2018/09/27	Yujie Yan

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GENERAL COMMENTS

Results relate only to the items tested.

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Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5748168	AGU	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2018/09/26	NC		%	20
			1,2,3,7,8-Penta CDD	2018/09/26	NC		%	20
			1,2,3,4,7,8-Hexa CDD	2018/09/26	NC		%	20
			1,2,3,6,7,8-Hexa CDD	2018/09/26	NC		%	20
			1,2,3,7,8,9-Hexa CDD	2018/09/26	NC		%	20
			1,2,3,4,6,7,8-Hepta CDD	2018/09/26	NC		%	20
			1,2,3,4,6,7,8,9-Octa CDD	2018/09/26	NC		%	20
			Total Tetra CDD	2018/09/26	NC		%	20
			Total Penta CDD	2018/09/26	NC		%	20
			Total Hexa CDD	2018/09/26	NC		%	20
			Total Hepta CDD	2018/09/26	NC		%	20
			2,3,7,8-Tetra CDF	2018/09/26	NC		%	20
			1,2,3,7,8-Penta CDF	2018/09/26	NC		%	20
			2,3,4,7,8-Penta CDF	2018/09/26	NC		%	20
			1,2,3,4,7,8-Hexa CDF	2018/09/26	NC		%	20
			1,2,3,6,7,8-Hexa CDF	2018/09/26	NC		%	20
			2,3,4,6,7,8-Hexa CDF	2018/09/26	NC		%	20
			1,2,3,7,8,9-Hexa CDF	2018/09/26	NC		%	20
			1,2,3,4,6,7,8-Hepta CDF	2018/09/26	NC		%	20
			1,2,3,4,7,8,9-Hepta CDF	2018/09/26	NC		%	20
			1,2,3,4,6,7,8,9-Octa CDF	2018/09/26	NC		%	20
			Total Tetra CDF	2018/09/26	NC		%	20
			Total Penta CDF	2018/09/26	NC		%	20
			Total Hexa CDF	2018/09/26	NC		%	20
			Total Hepta CDF	2018/09/26	NC		%	20
5748626	CXU	RPD - Sample/Sample Dup	33'44'-TetraCB-(77)	2018/09/27	NC		%	30
			344'5-TetraCB-(81)	2018/09/27	NC		%	30
			233'44'-PentaCB-(105)	2018/09/27	NC		%	30
			2344'5-PentaCB-(114)	2018/09/27	NC		%	30
			23'44'5-PentaCB-(118)	2018/09/27	NC		%	30
			23'44'5'-PentaCB-(123)	2018/09/27	NC		%	30
			33'44'5-PentaCB-(126)	2018/09/27	NC		%	30
			HexaCB-(156)+(157)	2018/09/27	NC		%	30
			23'44'55'-HexaCB-(167)	2018/09/27	NC		%	30
			33'44'55'-HexaCB-(169)	2018/09/27	NC		%	30
			233'44'55'-HeptaCB-(189)	2018/09/27	NC		%	30

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Branko Vrzic, A.SC.T., Senior Analyst, HRMS Services

Melanie Mabini, VOC Analyst

CHARTERED
Rodney A. Major
CHEMIST

Rodney Major, Manager Organic Processing Lab

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Your Project #: 1804600
Site#: MEDIA PREP
Site Location: ST. MARY'S BOWMANVILLE

Attention: kirk easto
RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/10/18
Report #: R5446065
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8O3742
Received: 2018/09/18, 17:00

Sample Matrix: Air Sampling Media
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Chlorobenzenes in MM5 Trains (EPA M0010)	1	2018/09/24	2018/09/24	BRL SOP-00202	In house (M0010)
Chlorophenols in MM5 Trains (EPA M0010)	1	2018/09/24	2018/09/26	BRL SOP-00204	In house (M0010)
Dioxins/Furans in Air (Method 23)	1	2018/09/24	2018/09/26	BRL SOP-00404	EPA M23/23A m
PAH's in MM5 SamplingTrains (CARB429mod)	1	2018/09/24	2018/09/24	BRL SOP-00201	CARB429(ARBM1,M2)mod
PCBs in a Sampling Train (1668Amod)	1	2018/09/24	2018/09/27	BRL SOP-00408	EPA 1668A m
VOST EPA5041A, 8260C for 0030, 0031	1	N/A	2018/09/27	BRL SOP-00302	EPA5041A, 8260C

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

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Your Project #: 1804600
Site#: MEDIA PREP
Site Location: ST. MARY'S BOWMANVILLE

Attention: kirk easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/10/18
Report #: R5446065
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8O3742
Received: 2018/09/18, 17:00

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769
==
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Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

RESULTS OF ANALYSES OF AIR SAMPLING MEDIA

Maxxam ID		HUA161							
Sampling Date		2018/09/18 17:11				**TOXIC EQUIVALENCY**		# of	
	UNITS	**TRAIN PROOF 1-8**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
33'44'-TetraCB-(77)	ng	<0.14	0.14	0.60	N/A	0.00010	0.000014		5748626
344'5-TetraCB-(81)	ng	<0.14	0.14	0.60	N/A	0.00030	0.000042		5748626
233'44'-PentaCB-(105)	ng	0.087	0.043	0.60	N/A	0.000030	0.0000026		5748626
2344'5-PentaCB-(114)	ng	<0.043	0.043	0.60	N/A	0.000030	0.0000013		5748626
23'44'5-PentaCB-(118)	ng	0.16	0.043	0.60	N/A	0.000030	0.0000048		5748626
23'44'5'-PentaCB-(123)	ng	<0.048	0.048	0.60	N/A	0.000030	0.0000014		5748626
33'44'5-PentaCB-(126)	ng	<0.042	0.042	0.60	N/A	0.10	0.0042		5748626
HexaCB-(156)+(157)	ng	<0.096	0.096	1.2	N/A	0.000030	0.0000029		5748626
23'44'55'-HexaCB-(167)	ng	<0.091	0.091	0.60	N/A	0.000030	0.0000027		5748626
33'44'55'-HexaCB-(169)	ng	<0.098	0.098	0.60	N/A	0.030	0.0029		5748626
233'44'55'-HeptaCB-(189)	ng	<0.12	0.12	0.60	N/A	0.000030	0.0000036		5748626
TOTAL TOXIC EQUIVALENCY	ng						0.0072		
Surrogate Recovery (%)									
C13-233'44'55'-HeptaCB-(189)	%	104							5748626
C13-233'44'5-HexaCB-(156)	%	94							5748626
C13-233'44'5'-HexaCB-(157)	%	94							5748626
C13-233'44'-PentaCB-(105)	%	103							5748626
C13-23'44'55'-HexaCB-(167)	%	93							5748626
C13-2344'5-PentaCB-(114)	%	102							5748626
C13-23'44'5-PentaCB-(118)	%	99							5748626
C13-2'344'5-PentaCB-(123)	%	98							5748626
C13-33'44'55'-HexaCB-(169)	%	80							5748626
C13-33'44'5-PentaCB-(126)	%	97							5748626
C13-33'44'-TetraCB-(77)	%	92							5748626
C13-344'5-TetraCB-(81)	%	90							5748626

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

N/A = Not Applicable

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Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

SEMI-VOLATILE ORGANICS BY GC-MS (AIR SAMPLING MEDIA)

Maxxam ID		HUA161			
Sampling Date		2018/09/18 17:11			
	UNITS	**TRAIN PROOF 1-8**	**RDL**	**MDL**	**QC Batch**
1-Methylnaphthalene	ug	<0.30	0.30	0.30	5747447
1-Methylphenanthrene	ug	<0.30	0.30	0.30	5747447
2-Chloronaphthalene	ug	<0.30	0.30	0.30	5747447
2-Methylanthracene	ug	<0.30	0.30	0.30	5747447
2-Methylnaphthalene	ug	<0.30	0.30	0.060	5747447
3-Methylcholanthrene	ug	<0.30	0.30	0.30	5747447
7,12-Dimethylbenzo(a)anthracene	ug	<1.2	1.2	0.30	5747447
9,10-Dimethylanthracene	ug	<0.30	0.30	0.30	5747447
Acenaphthene	ug	<0.30	0.30	0.060	5747447
Acenaphthylene	ug	<0.30	0.30	0.060	5747447
Anthracene	ug	<0.30	0.30	0.060	5747447
Benzo(a)anthracene	ug	<0.30	0.30	0.060	5747447
Benzo(a)fluorene	ug	<0.30	0.30	0.30	5747447
Benzo(a)pyrene	ug	<0.30	0.30	0.060	5747447
Benzo(b)Anthracene	ug	<0.30	0.30	0.060	5747447
Benzo(b)fluoranthene	ug	<0.30	0.30	0.060	5747447
Benzo(b)fluorene	ug	<0.30	0.30	0.30	5747447
Benzo(e)pyrene	ug	<0.30	0.30	0.30	5747447
Benzo(g,h,i)perylene	ug	<0.30	0.30	0.060	5747447
Benzo(k)fluoranthene	ug	<0.30	0.30	0.060	5747447
Biphenyl	ug	<0.30	0.30	0.30	5747447
Chrysene	ug	<0.30	0.30	0.060	5747447
Coronene	ug	<0.30	0.30	0.30	5747447
Dibenz(a,h)anthracene	ug	<0.30	0.30	0.060	5747447
Dibenzo(a,c)anthracene	ug	<0.30	0.30	0.060	5747447
Dibenzo(a,e)pyrene	ug	<0.30	0.30	0.30	5747447
Fluoranthene	ug	<0.30	0.30	0.060	5747447
Fluorene	ug	<0.30	0.30	0.060	5747447
Indeno(1,2,3-cd)pyrene	ug	<0.30	0.30	0.060	5747447
m-Terphenyl	ug	<0.30	0.30	0.30	5747447
Naphthalene	ug	<0.30	0.30	0.30	5747447
o-Terphenyl	ug	<0.30	0.30	0.30	5747447
Perylene	ug	<0.30	0.30	0.30	5747447
Phenanthrene	ug	<0.30	0.30	0.060	5747447
Picene	ug	<0.30	0.30	0.060	5747447

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

SEMI-VOLATILE ORGANICS BY GC-MS (AIR SAMPLING MEDIA)

Maxxam ID		HUA161			
Sampling Date		2018/09/18 17:11			
	UNITS	**TRAIN PROOF 1-8**	**RDL**	**MDL**	**QC Batch**
p-Terphenyl	ug	<0.30	0.30	0.30	5747447
Pyrene	ug	<0.30	0.30	0.060	5747447
Quinoline	ug	<0.30	0.30	0.30	5747447
Tetralin	ug	<0.30	0.30	0.30	5747447
Triphenylene	ug	<0.30	0.30	0.060	5747447
1,2,3,4-Tetrachlorobenzene	ug	<0.30	0.30	0.060	5747460
1,2,3,5+1,2,4,5-Tetrachlorobenzene	ug	<0.30	0.30	0.060	5747460
1,2,3-Trichlorobenzene	ug	<0.30	0.30	0.060	5747460
1,2,4-Trichlorobenzene	ug	<0.30	0.30	0.060	5747460
1,2-Dichlorobenzene	ug	<0.30	0.30	0.060	5747460
1,3,5-Trichlorobenzene	ug	<0.30	0.30	0.060	5747460
1,3-Dichlorobenzene	ug	<0.30	0.30	0.060	5747460
1,4-Dichlorobenzene	ug	<0.30	0.30	0.060	5747460
Hexachlorobenzene	ug	<0.30	0.30	0.060	5747460
Pentachlorobenzene	ug	<0.30	0.30	0.060	5747460
2,3,4,5-Tetrachlorophenol	ug	<0.30	0.30	0.24	5747742
2,3,4,6-Tetrachlorophenol	ug	<0.30	0.30	0.24	5747742
2,3,4-Trichlorophenol	ug	<0.30	0.30	0.24	5747742
2,3,5,6-Tetrachlorophenol	ug	<0.30	0.30	0.24	5747742
2,3,5-Trichlorophenol	ug	<0.30	0.30	0.24	5747742
2,3,6-Trichlorophenol	ug	<0.30	0.30	0.24	5747742
2,3-Dichlorophenol	ug	<0.30	0.30	0.24	5747742
2,4 + 2,5-Dichlorophenol	ug	<0.30	0.30	0.24	5747742
2,4,5-Trichlorophenol	ug	<0.30	0.30	0.24	5747742
2,4,6-Trichlorophenol	ug	<0.30	0.30	0.24	5747742
2,6-Dichlorophenol	ug	<0.30	0.30	0.24	5747742
2-Chlorophenol	ug	<0.30	0.30	0.24	5747742
3,4,5-Trichlorophenol	ug	<0.30	0.30	0.24	5747742
3,4-Dichlorophenol	ug	<0.30	0.30	0.24	5747742
3,5-Dichlorophenol	ug	<0.30	0.30	0.24	5747742
3-Chlorophenol	ug	<0.30	0.30	0.24	5747742
4-Chlorophenol	ug	<0.30	0.30	0.24	5747742
Pentachlorophenol	ug	<0.30	0.30	0.24	5747742
Surrogate Recovery (%)					
13C6-Hexachlorobenzene	%	102			5747460

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

SEMI-VOLATILE ORGANICS BY GC-MS (AIR SAMPLING MEDIA)

Maxxam ID		HUA161			
Sampling Date		2018/09/18 17:11			
	UNITS	**TRAIN PROOF 1-8**	**RDL**	**MDL**	**QC Batch**
2H3-1,2,4-Trichlorobenzene	%	103			5747460
2H4-1,3-Dichlorobenzene	%	98			5747460
D3-2,4-Dichlorophenol	%	88			5747742
D6-Pentachlorophenol	%	98			5747742
D10-2-Methylnaphthalene	%	70			5747447
D10-Fluoranthene	%	70			5747447
D10-Phenanthrene	%	70			5747447
D12-Benzo(a)anthracene	%	82			5747447
D12-Benzo(a)pyrene	%	82			5747447
D12-Benzo(b)fluoranthene	%	88			5747447
D12-Benzo(ghi)perylene	%	84			5747447
D12-Benzo(k)fluoranthene	%	76			5747447
D12-Chrysene	%	80			5747447
D12-Indeno(1,2,3-cd)pyrene	%	82			5747447
D12-Perylene	%	76			5747447
D14-Dibenzo(a,h)anthracene	%	80			5747447
D8-Acenaphthylene	%	68			5747447
D8-Naphthalene	%	68			5747447

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

VOLATILE ORGANICS BY GC/MS (AIR SAMPLING MEDIA)

Maxxam ID		HUA336			
Sampling Date		2018/09/18 17:11			
	UNITS	**VOST PROOF 1-9**	**RDL**	**MDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug	<0.020	0.020	0.020	5754531
Chloromethane	ug	<0.015	0.015	0.015	5754531
Vinyl Chloride	ug	<0.013	0.013	0.013	5754531
Bromomethane	ug	<0.015	0.015	0.015	5754531
Chloroethane	ug	<0.0090	0.0090	0.0090	5754531
Trichlorofluoromethane (FREON 11)	ug	<0.010	0.010	0.010	5754531
Acetone (2-Propanone)	ug	<0.045	0.045	0.025	5754531
1,1-Dichloroethylene	ug	<0.011	0.011	0.011	5754531
Iodomethane	ug	<0.015	0.015	0.015	5754531
Carbon Disulfide	ug	<0.026	0.026	0.026	5754531
Methylene Chloride(Dichloromethane)	ug	<0.019	0.019	0.020	5754531
1,1-Dichloroethane	ug	<0.012	0.012	0.012	5754531
trans-1,2-Dichloroethylene	ug	<0.010	0.010	0.010	5754531
cis-1,2-Dichloroethylene	ug	<0.010	0.010	0.010	5754531
Chloroform	ug	<0.011	0.011	0.011	5754531
1,2-Dichloroethane	ug	<0.0070	0.0070	0.0070	5754531
Methyl Ethyl Ketone (2-Butanone)	ug	<0.036	0.036	0.036	5754531
1,1,1-Trichloroethane	ug	<0.014	0.014	0.014	5754531
Carbon Tetrachloride	ug	<0.016	0.016	0.016	5754531
Benzene	ug	<0.0090	0.0090	0.0090	5754531
1,1,2-Trichloroethane	ug	<0.016	0.016	0.016	5754531
1,2-Dichloropropane	ug	<0.011	0.011	0.011	5754531
Trichloroethylene	ug	<0.011	0.011	0.011	5754531
Dibromomethane	ug	<0.010	0.010	0.010	5754531
Bromodichloromethane	ug	<0.011	0.011	0.011	5754531
cis-1,3-Dichloropropene	ug	<0.010	0.010	0.010	5754531
trans-1,3-Dichloropropene	ug	<0.0070	0.0070	0.0070	5754531
Dibromochloromethane	ug	<0.0090	0.0090	0.0090	5754531
Methyl Isobutyl Ketone	ug	<0.019	0.019	0.019	5754531
Methyl Butyl Ketone (2-Hexanone)	ug	<0.031	0.031	0.031	5754531
Toluene	ug	<0.014	0.014	0.014	5754531
Ethylene Dibromide	ug	<0.010	0.010	0.010	5754531
Tetrachloroethylene	ug	<0.018	0.018	0.018	5754531
Chlorobenzene	ug	<0.011	0.011	0.011	5754531
1,1,1,2-Tetrachloroethane	ug	<0.010	0.010	0.010	5754531

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

VOLATILE ORGANICS BY GC/MS (AIR SAMPLING MEDIA)

Maxxam ID		HUA336			
Sampling Date		2018/09/18 17:11			
	UNITS	**VOST PROOF 1-9**	**RDL**	**MDL**	**QC Batch**
Ethylbenzene	ug	<0.014	0.014	0.014	5754531
m / p-Xylene	ug	<0.015	0.015	0.015	5754531
Styrene	ug	<0.012	0.012	0.012	5754531
o-Xylene	ug	<0.015	0.015	0.015	5754531
Bromoform	ug	<0.014	0.014	0.014	5754531
1,1,2,2-Tetrachloroethane	ug	<0.014	0.014	0.014	5754531
1,2,3-Trichloropropane	ug	<0.015	0.015	0.015	5754531
1,3-Dichlorobenzene	ug	<0.020	0.020	0.020	5754531
1,4-Dichlorobenzene	ug	<0.020	0.020	0.020	5754531
1,2-Dichlorobenzene	ug	<0.020	0.020	0.020	5754531
Surrogate Recovery (%)					
Bromofluorobenzene	%	101			5754531
D10-Ethylbenzene (FS)	%	90			5754531
D4-1,2-Dichloroethane	%	106			5754531
D8-Toluene	%	100			5754531

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

DIOXINS AND FURANS BY HRMS (AIR SAMPLING MEDIA)

Maxxam ID		HUA161							
Sampling Date		2018/09/18 17:11				TOXIC EQUIVALENCY		# of	
	UNITS	**TRAIN PROOF 1-8**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	<1.1	1.1	10	2.0	1.00	1.10		5748168
1,2,3,7,8-Penta CDD *	pg	<1.1	1.1	10	2.0	1.00	1.10		5748168
1,2,3,4,7,8-Hexa CDD *	pg	<1.0	1.0	10	2.0	0.100	0.100		5748168
1,2,3,6,7,8-Hexa CDD *	pg	<1.0	1.0	10	2.0	0.100	0.100		5748168
1,2,3,7,8,9-Hexa CDD *	pg	<0.96	0.96	10	2.0	0.100	0.0960		5748168
1,2,3,4,6,7,8-Hepta CDD *	pg	<1.1	1.1	10	3.0	0.0100	0.0110		5748168
1,2,3,4,6,7,8,9-Octa CDD *	pg	<1.1	1.1	100	3.0	0.000300	0.000330		5748168
Total Tetra CDD *	pg	<1.1	1.1	10	N/A			0	5748168
Total Penta CDD *	pg	<1.1	1.1	10	N/A			0	5748168
Total Hexa CDD *	pg	<1.0	1.0	10	N/A			0	5748168
Total Hepta CDD *	pg	<1.1	1.1	10	N/A			0	5748168
2,3,7,8-Tetra CDF **	pg	<0.99	0.99	10	2.0	0.100	0.0990		5748168
1,2,3,7,8-Penta CDF **	pg	<1.0	1.0	10	2.0	0.0300	0.0300		5748168
2,3,4,7,8-Penta CDF **	pg	<1.0	1.0	10	2.0	0.300	0.300		5748168
1,2,3,4,7,8-Hexa CDF **	pg	<0.97	0.97	10	2.0	0.100	0.0970		5748168
1,2,3,6,7,8-Hexa CDF **	pg	<0.99	0.99	10	2.0	0.100	0.0990		5748168
2,3,4,6,7,8-Hexa CDF **	pg	<1.0	1.0	10	2.0	0.100	0.100		5748168
1,2,3,7,8,9-Hexa CDF **	pg	<1.2	1.2	10	2.0	0.100	0.120		5748168
1,2,3,4,6,7,8-Hepta CDF **	pg	<0.88	0.88	10	3.0	0.0100	0.00880		5748168
1,2,3,4,7,8,9-Hepta CDF **	pg	<1.2	1.2	10	2.0	0.0100	0.0120		5748168
1,2,3,4,6,7,8,9-Octa CDF **	pg	<0.99	0.99	100	5.0	0.000300	0.000297		5748168
Total Tetra CDF **	pg	<0.99	0.99	10	N/A			0	5748168
Total Penta CDF **	pg	<1.0	1.0	10	N/A			0	5748168
Total Hexa CDF **	pg	<1.0	1.0	10	N/A			0	5748168
Total Hepta CDF **	pg	<1.0	1.0	10	N/A			0	5748168
TOTAL TOXIC EQUIVALENCY	pg						3.37		

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

DIOXINS AND FURANS BY HRMS (AIR SAMPLING MEDIA)

Maxxam ID		HUA161							
Sampling Date		2018/09/18 17:11				TOXIC EQUIVALENCY		# of	
	UNITS	**TRAIN PROOF 1-8**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	106							5748168
C13-1234678 HeptaCDF **	%	100							5748168
C13-123678 HexaCDD *	%	77							5748168
C13-123678 HexaCDF **	%	94							5748168
C13-12378 PentaCDD *	%	101							5748168
C13-12378 PentaCDF **	%	102							5748168
C13-2378 TetraCDD *	%	109							5748168
C13-2378 TetraCDF **	%	91							5748168
C13-Octachlorodibenzo-p-Dioxin	%	122							5748168

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

TEST SUMMARY

Maxxam ID: HUA161
Sample ID: TRAIN PROOF 1-8
Matrix: Air Sampling Media

Collected: 2018/09/18
Shipped:
Received: 2018/09/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chlorobenzenes in MM5 Trains (EPA M0010)	GC/MS	5747460	2018/09/24	2018/09/24	Fan (Carrie) Jiang
Chlorophenols in MM5 Trains (EPA M0010)	GC/MS	5747742	2018/09/24	2018/09/26	Fan (Carrie) Jiang
Dioxins/Furans in Air (Method 23)	HRMS/MS	5748168	2018/09/24	2018/09/26	Angel Guerrero
PAH's in MM5 SamplingTrains (CARB429mod)	GC/MS	5747447	2018/09/24	2018/09/24	Fan (Carrie) Jiang
PCBs in a Sampling Train (1668Amod)	HRMS/MS	5748626	2018/09/24	2018/09/27	Cathy Xu

Maxxam ID: HUA161 Dup
Sample ID: TRAIN PROOF 1-8
Matrix: Air Sampling Media

Collected: 2018/09/18
Shipped:
Received: 2018/09/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Air (Method 23)	HRMS/MS	5748168	2018/09/24	2018/09/26	Angel Guerrero
PCBs in a Sampling Train (1668Amod)	HRMS/MS	5748626	2018/10/03	2018/09/27	Cathy Xu

Maxxam ID: HUA336
Sample ID: VOST PROOF 1-9
Matrix: Air Sampling Media

Collected: 2018/09/18
Shipped:
Received: 2018/09/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	5754531	N/A	2018/09/27	Yujie Yan

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GENERAL COMMENTS

Results relate only to the items tested.

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Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5748168	AGU	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2018/09/26	NC		%	20
			1,2,3,7,8-Penta CDD	2018/09/26	NC		%	20
			1,2,3,4,7,8-Hexa CDD	2018/09/26	NC		%	20
			1,2,3,6,7,8-Hexa CDD	2018/09/26	NC		%	20
			1,2,3,7,8,9-Hexa CDD	2018/09/26	NC		%	20
			1,2,3,4,6,7,8-Hepta CDD	2018/09/26	NC		%	20
			1,2,3,4,6,7,8,9-Octa CDD	2018/09/26	NC		%	20
			Total Tetra CDD	2018/09/26	NC		%	20
			Total Penta CDD	2018/09/26	NC		%	20
			Total Hexa CDD	2018/09/26	NC		%	20
			Total Hepta CDD	2018/09/26	NC		%	20
			2,3,7,8-Tetra CDF	2018/09/26	NC		%	20
			1,2,3,7,8-Penta CDF	2018/09/26	NC		%	20
			2,3,4,7,8-Penta CDF	2018/09/26	NC		%	20
			1,2,3,4,7,8-Hexa CDF	2018/09/26	NC		%	20
			1,2,3,6,7,8-Hexa CDF	2018/09/26	NC		%	20
			2,3,4,6,7,8-Hexa CDF	2018/09/26	NC		%	20
			1,2,3,7,8,9-Hexa CDF	2018/09/26	NC		%	20
			1,2,3,4,6,7,8-Hepta CDF	2018/09/26	NC		%	20
			1,2,3,4,7,8,9-Hepta CDF	2018/09/26	NC		%	20
			1,2,3,4,6,7,8,9-Octa CDF	2018/09/26	NC		%	20
			Total Tetra CDF	2018/09/26	NC		%	20
			Total Penta CDF	2018/09/26	NC		%	20
			Total Hexa CDF	2018/09/26	NC		%	20
			Total Hepta CDF	2018/09/26	NC		%	20
5748626	CXU	RPD - Sample/Sample Dup	33'44'-TetraCB-(77)	2018/09/27	NC		%	30
			344'5-TetraCB-(81)	2018/09/27	NC		%	30
			233'44'-PentaCB-(105)	2018/09/27	NC		%	30
			2344'5-PentaCB-(114)	2018/09/27	NC		%	30
			23'44'5-PentaCB-(118)	2018/09/27	NC		%	30
			23'44'5'-PentaCB-(123)	2018/09/27	NC		%	30
			33'44'5-PentaCB-(126)	2018/09/27	NC		%	30
			HexaCB-(156)+(157)	2018/09/27	NC		%	30
			23'44'55'-HexaCB-(167)	2018/09/27	NC		%	30
			33'44'55'-HexaCB-(169)	2018/09/27	NC		%	30
			233'44'55'-HeptaCB-(189)	2018/09/27	NC		%	30

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Branko Vrzic, A.SC.T., Senior Analyst, HRMS Services

Melanie Mabini, VOC Analyst

CHARTERED Rodney A. Major CHEMIST

Rodney Major, Manager Organic Processing Lab

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Your Project #: 1804600
Site#: MEDIA PREP
Site Location: ST. MARY'S BOWMANVILLE

Attention: kirk easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/10/18
Report #: R5446065
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8O3742
Received: 2018/09/18, 17:00

Sample Matrix: Air Sampling Media
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Chlorobenzenes in MM5 Trains (EPA M0010)	1	2018/09/24	2018/09/24	BRL SOP-00202	In house (M0010)
Chlorophenols in MM5 Trains (EPA M0010)	1	2018/09/24	2018/09/26	BRL SOP-00204	In house (M0010)
Dioxins/Furans in Air (Method 23)	1	2018/09/24	2018/09/26	BRL SOP-00404	EPA M23/23A m
PAH's in MM5 SamplingTrains (CARB429mod)	1	2018/09/24	2018/09/24	BRL SOP-00201	CARB429(ARBM1,M2)mod
PCBs in a Sampling Train (1668Amod)	1	2018/09/24	2018/09/27	BRL SOP-00408	EPA 1668A m
VOST EPA5041A, 8260C for 0030, 0031	1	N/A	2018/09/27	BRL SOP-00302	EPA5041A, 8260C

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

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Your Project #: 1804600
Site#: MEDIA PREP
Site Location: ST. MARY'S BOWMANVILLE

Attention: kirk easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/10/18
Report #: R5446065
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8O3742
Received: 2018/09/18, 17:00

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

RESULTS OF ANALYSES OF AIR SAMPLING MEDIA

Maxxam ID		HUA161							
Sampling Date		2018/09/18 17:11				TOXIC EQUIVALENCY		# of	
	UNITS	**TRAIN PROOF 1-8**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
33'44'-TetraCB-(77)	ng	<0.14	0.14	0.60	N/A	0.00010	0.000014		5748626
344'5-TetraCB-(81)	ng	<0.14	0.14	0.60	N/A	0.00030	0.000042		5748626
233'44'-PentaCB-(105)	ng	0.087	0.043	0.60	N/A	0.000030	0.0000026		5748626
2344'5-PentaCB-(114)	ng	<0.043	0.043	0.60	N/A	0.000030	0.0000013		5748626
23'44'5-PentaCB-(118)	ng	0.16	0.043	0.60	N/A	0.000030	0.0000048		5748626
23'44'5'-PentaCB-(123)	ng	<0.048	0.048	0.60	N/A	0.000030	0.0000014		5748626
33'44'5-PentaCB-(126)	ng	<0.042	0.042	0.60	N/A	0.10	0.0042		5748626
HexaCB-(156)+(157)	ng	<0.096	0.096	1.2	N/A	0.000030	0.0000029		5748626
23'44'55'-HexaCB-(167)	ng	<0.091	0.091	0.60	N/A	0.000030	0.0000027		5748626
33'44'55'-HexaCB-(169)	ng	<0.098	0.098	0.60	N/A	0.030	0.0029		5748626
233'44'55'-HeptaCB-(189)	ng	<0.12	0.12	0.60	N/A	0.000030	0.0000036		5748626
TOTAL TOXIC EQUIVALENCY	ng						0.0072		
Surrogate Recovery (%)									
C13-233'44'55'-HeptaCB-(189)	%	104							5748626
C13-233'44'5-HexaCB-(156)	%	94							5748626
C13-233'44'5'-HexaCB-(157)	%	94							5748626
C13-233'44'-PentaCB-(105)	%	103							5748626
C13-23'44'55'-HexaCB-(167)	%	93							5748626
C13-2344'5-PentaCB-(114)	%	102							5748626
C13-23'44'5-PentaCB-(118)	%	99							5748626
C13-2'344'5-PentaCB-(123)	%	98							5748626
C13-33'44'55'-HexaCB-(169)	%	80							5748626
C13-33'44'5-PentaCB-(126)	%	97							5748626
C13-33'44'-TetraCB-(77)	%	92							5748626
C13-344'5-TetraCB-(81)	%	90							5748626

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

SEMI-VOLATILE ORGANICS BY GC-MS (AIR SAMPLING MEDIA)

Maxxam ID		HUA161			
Sampling Date		2018/09/18 17:11			
	UNITS	**TRAIN PROOF 1-8**	**RDL**	**MDL**	**QC Batch**
1-Methylnaphthalene	ug	<0.30	0.30	0.30	5747447
1-Methylphenanthrene	ug	<0.30	0.30	0.30	5747447
2-Chloronaphthalene	ug	<0.30	0.30	0.30	5747447
2-Methylanthracene	ug	<0.30	0.30	0.30	5747447
2-Methylnaphthalene	ug	<0.30	0.30	0.060	5747447
3-Methylcholanthrene	ug	<0.30	0.30	0.30	5747447
7,12-Dimethylbenzo(a)anthracene	ug	<1.2	1.2	0.30	5747447
9,10-Dimethylanthracene	ug	<0.30	0.30	0.30	5747447
Acenaphthene	ug	<0.30	0.30	0.060	5747447
Acenaphthylene	ug	<0.30	0.30	0.060	5747447
Anthracene	ug	<0.30	0.30	0.060	5747447
Benzo(a)anthracene	ug	<0.30	0.30	0.060	5747447
Benzo(a)fluorene	ug	<0.30	0.30	0.30	5747447
Benzo(a)pyrene	ug	<0.30	0.30	0.060	5747447
Benzo(b)Anthracene	ug	<0.30	0.30	0.060	5747447
Benzo(b)fluoranthene	ug	<0.30	0.30	0.060	5747447
Benzo(b)fluorene	ug	<0.30	0.30	0.30	5747447
Benzo(e)pyrene	ug	<0.30	0.30	0.30	5747447
Benzo(g,h,i)perylene	ug	<0.30	0.30	0.060	5747447
Benzo(k)fluoranthene	ug	<0.30	0.30	0.060	5747447
Biphenyl	ug	<0.30	0.30	0.30	5747447
Chrysene	ug	<0.30	0.30	0.060	5747447
Coronene	ug	<0.30	0.30	0.30	5747447
Dibenz(a,h)anthracene	ug	<0.30	0.30	0.060	5747447
Dibenzo(a,c)anthracene	ug	<0.30	0.30	0.060	5747447
Dibenzo(a,e)pyrene	ug	<0.30	0.30	0.30	5747447
Fluoranthene	ug	<0.30	0.30	0.060	5747447
Fluorene	ug	<0.30	0.30	0.060	5747447
Indeno(1,2,3-cd)pyrene	ug	<0.30	0.30	0.060	5747447
m-Terphenyl	ug	<0.30	0.30	0.30	5747447
Naphthalene	ug	<0.30	0.30	0.30	5747447
o-Terphenyl	ug	<0.30	0.30	0.30	5747447
Perylene	ug	<0.30	0.30	0.30	5747447
Phenanthrene	ug	<0.30	0.30	0.060	5747447
Picene	ug	<0.30	0.30	0.060	5747447

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

SEMI-VOLATILE ORGANICS BY GC-MS (AIR SAMPLING MEDIA)

Maxxam ID		HUA161			
Sampling Date		2018/09/18 17:11			
	UNITS	**TRAIN PROOF 1-8**	**RDL**	**MDL**	**QC Batch**
p-Terphenyl	ug	<0.30	0.30	0.30	5747447
Pyrene	ug	<0.30	0.30	0.060	5747447
Quinoline	ug	<0.30	0.30	0.30	5747447
Tetralin	ug	<0.30	0.30	0.30	5747447
Triphenylene	ug	<0.30	0.30	0.060	5747447
1,2,3,4-Tetrachlorobenzene	ug	<0.30	0.30	0.060	5747460
1,2,3,5+1,2,4,5-Tetrachlorobenzene	ug	<0.30	0.30	0.060	5747460
1,2,3-Trichlorobenzene	ug	<0.30	0.30	0.060	5747460
1,2,4-Trichlorobenzene	ug	<0.30	0.30	0.060	5747460
1,2-Dichlorobenzene	ug	<0.30	0.30	0.060	5747460
1,3,5-Trichlorobenzene	ug	<0.30	0.30	0.060	5747460
1,3-Dichlorobenzene	ug	<0.30	0.30	0.060	5747460
1,4-Dichlorobenzene	ug	<0.30	0.30	0.060	5747460
Hexachlorobenzene	ug	<0.30	0.30	0.060	5747460
Pentachlorobenzene	ug	<0.30	0.30	0.060	5747460
2,3,4,5-Tetrachlorophenol	ug	<0.30	0.30	0.24	5747742
2,3,4,6-Tetrachlorophenol	ug	<0.30	0.30	0.24	5747742
2,3,4-Trichlorophenol	ug	<0.30	0.30	0.24	5747742
2,3,5,6-Tetrachlorophenol	ug	<0.30	0.30	0.24	5747742
2,3,5-Trichlorophenol	ug	<0.30	0.30	0.24	5747742
2,3,6-Trichlorophenol	ug	<0.30	0.30	0.24	5747742
2,3-Dichlorophenol	ug	<0.30	0.30	0.24	5747742
2,4 + 2,5-Dichlorophenol	ug	<0.30	0.30	0.24	5747742
2,4,5-Trichlorophenol	ug	<0.30	0.30	0.24	5747742
2,4,6-Trichlorophenol	ug	<0.30	0.30	0.24	5747742
2,6-Dichlorophenol	ug	<0.30	0.30	0.24	5747742
2-Chlorophenol	ug	<0.30	0.30	0.24	5747742
3,4,5-Trichlorophenol	ug	<0.30	0.30	0.24	5747742
3,4-Dichlorophenol	ug	<0.30	0.30	0.24	5747742
3,5-Dichlorophenol	ug	<0.30	0.30	0.24	5747742
3-Chlorophenol	ug	<0.30	0.30	0.24	5747742
4-Chlorophenol	ug	<0.30	0.30	0.24	5747742
Pentachlorophenol	ug	<0.30	0.30	0.24	5747742
Surrogate Recovery (%)					
13C6-Hexachlorobenzene	%	102			5747460

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

SEMI-VOLATILE ORGANICS BY GC-MS (AIR SAMPLING MEDIA)

Maxxam ID		HUA161			
Sampling Date		2018/09/18 17:11			
	UNITS	**TRAIN PROOF 1-8**	**RDL**	**MDL**	**QC Batch**
2H3-1,2,4-Trichlorobenzene	%	103			5747460
2H4-1,3-Dichlorobenzene	%	98			5747460
D3-2,4-Dichlorophenol	%	88			5747742
D6-Pentachlorophenol	%	98			5747742
D10-2-Methylnaphthalene	%	70			5747447
D10-Fluoranthene	%	70			5747447
D10-Phenanthrene	%	70			5747447
D12-Benzo(a)anthracene	%	82			5747447
D12-Benzo(a)pyrene	%	82			5747447
D12-Benzo(b)fluoranthene	%	88			5747447
D12-Benzo(ghi)perylene	%	84			5747447
D12-Benzo(k)fluoranthene	%	76			5747447
D12-Chrysene	%	80			5747447
D12-Indeno(1,2,3-cd)pyrene	%	82			5747447
D12-Perylene	%	76			5747447
D14-Dibenzo(a,h)anthracene	%	80			5747447
D8-Acenaphthylene	%	68			5747447
D8-Naphthalene	%	68			5747447

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

VOLATILE ORGANICS BY GC/MS (AIR SAMPLING MEDIA)

Maxxam ID		HUA336			
Sampling Date		2018/09/18 17:11			
	UNITS	**VOST PROOF 1-9**	**RDL**	**MDL**	**QC Batch**
Dichlorodifluoromethane (FREON 12)	ug	<0.020	0.020	0.020	5754531
Chloromethane	ug	<0.015	0.015	0.015	5754531
Vinyl Chloride	ug	<0.013	0.013	0.013	5754531
Bromomethane	ug	<0.015	0.015	0.015	5754531
Chloroethane	ug	<0.0090	0.0090	0.0090	5754531
Trichlorofluoromethane (FREON 11)	ug	<0.010	0.010	0.010	5754531
Acetone (2-Propanone)	ug	<0.045	0.045	0.025	5754531
1,1-Dichloroethylene	ug	<0.011	0.011	0.011	5754531
Iodomethane	ug	<0.015	0.015	0.015	5754531
Carbon Disulfide	ug	<0.026	0.026	0.026	5754531
Methylene Chloride(Dichloromethane)	ug	<0.019	0.019	0.020	5754531
1,1-Dichloroethane	ug	<0.012	0.012	0.012	5754531
trans-1,2-Dichloroethylene	ug	<0.010	0.010	0.010	5754531
cis-1,2-Dichloroethylene	ug	<0.010	0.010	0.010	5754531
Chloroform	ug	<0.011	0.011	0.011	5754531
1,2-Dichloroethane	ug	<0.0070	0.0070	0.0070	5754531
Methyl Ethyl Ketone (2-Butanone)	ug	<0.036	0.036	0.036	5754531
1,1,1-Trichloroethane	ug	<0.014	0.014	0.014	5754531
Carbon Tetrachloride	ug	<0.016	0.016	0.016	5754531
Benzene	ug	<0.0090	0.0090	0.0090	5754531
1,1,2-Trichloroethane	ug	<0.016	0.016	0.016	5754531
1,2-Dichloropropane	ug	<0.011	0.011	0.011	5754531
Trichloroethylene	ug	<0.011	0.011	0.011	5754531
Dibromomethane	ug	<0.010	0.010	0.010	5754531
Bromodichloromethane	ug	<0.011	0.011	0.011	5754531
cis-1,3-Dichloropropene	ug	<0.010	0.010	0.010	5754531
trans-1,3-Dichloropropene	ug	<0.0070	0.0070	0.0070	5754531
Dibromochloromethane	ug	<0.0090	0.0090	0.0090	5754531
Methyl Isobutyl Ketone	ug	<0.019	0.019	0.019	5754531
Methyl Butyl Ketone (2-Hexanone)	ug	<0.031	0.031	0.031	5754531
Toluene	ug	<0.014	0.014	0.014	5754531
Ethylene Dibromide	ug	<0.010	0.010	0.010	5754531
Tetrachloroethylene	ug	<0.018	0.018	0.018	5754531
Chlorobenzene	ug	<0.011	0.011	0.011	5754531
1,1,1,2-Tetrachloroethane	ug	<0.010	0.010	0.010	5754531

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

VOLATILE ORGANICS BY GC/MS (AIR SAMPLING MEDIA)

Maxxam ID		HUA336			
Sampling Date		2018/09/18 17:11			
	UNITS	**VOST PROOF 1-9**	**RDL**	**MDL**	**QC Batch**
Ethylbenzene	ug	<0.014	0.014	0.014	5754531
m / p-Xylene	ug	<0.015	0.015	0.015	5754531
Styrene	ug	<0.012	0.012	0.012	5754531
o-Xylene	ug	<0.015	0.015	0.015	5754531
Bromoform	ug	<0.014	0.014	0.014	5754531
1,1,2,2-Tetrachloroethane	ug	<0.014	0.014	0.014	5754531
1,2,3-Trichloropropane	ug	<0.015	0.015	0.015	5754531
1,3-Dichlorobenzene	ug	<0.020	0.020	0.020	5754531
1,4-Dichlorobenzene	ug	<0.020	0.020	0.020	5754531
1,2-Dichlorobenzene	ug	<0.020	0.020	0.020	5754531
Surrogate Recovery (%)					
Bromofluorobenzene	%	101			5754531
D10-Ethylbenzene (FS)	%	90			5754531
D4-1,2-Dichloroethane	%	106			5754531
D8-Toluene	%	100			5754531

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

DIOXINS AND FURANS BY HRMS (AIR SAMPLING MEDIA)

Maxxam ID		HUA161							
Sampling Date		2018/09/18 17:11				**TOXIC EQUIVALENCY**		# of	
	UNITS	**TRAIN PROOF 1-8**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	<1.1	1.1	10	2.0	1.00	1.10		5748168
1,2,3,7,8-Penta CDD *	pg	<1.1	1.1	10	2.0	1.00	1.10		5748168
1,2,3,4,7,8-Hexa CDD *	pg	<1.0	1.0	10	2.0	0.100	0.100		5748168
1,2,3,6,7,8-Hexa CDD *	pg	<1.0	1.0	10	2.0	0.100	0.100		5748168
1,2,3,7,8,9-Hexa CDD *	pg	<0.96	0.96	10	2.0	0.100	0.0960		5748168
1,2,3,4,6,7,8-Hepta CDD *	pg	<1.1	1.1	10	3.0	0.0100	0.0110		5748168
1,2,3,4,6,7,8,9-Octa CDD *	pg	<1.1	1.1	100	3.0	0.000300	0.000330		5748168
Total Tetra CDD *	pg	<1.1	1.1	10	N/A			0	5748168
Total Penta CDD *	pg	<1.1	1.1	10	N/A			0	5748168
Total Hexa CDD *	pg	<1.0	1.0	10	N/A			0	5748168
Total Hepta CDD *	pg	<1.1	1.1	10	N/A			0	5748168
2,3,7,8-Tetra CDF **	pg	<0.99	0.99	10	2.0	0.100	0.0990		5748168
1,2,3,7,8-Penta CDF **	pg	<1.0	1.0	10	2.0	0.0300	0.0300		5748168
2,3,4,7,8-Penta CDF **	pg	<1.0	1.0	10	2.0	0.300	0.300		5748168
1,2,3,4,7,8-Hexa CDF **	pg	<0.97	0.97	10	2.0	0.100	0.0970		5748168
1,2,3,6,7,8-Hexa CDF **	pg	<0.99	0.99	10	2.0	0.100	0.0990		5748168
2,3,4,6,7,8-Hexa CDF **	pg	<1.0	1.0	10	2.0	0.100	0.100		5748168
1,2,3,7,8,9-Hexa CDF **	pg	<1.2	1.2	10	2.0	0.100	0.120		5748168
1,2,3,4,6,7,8-Hepta CDF **	pg	<0.88	0.88	10	3.0	0.0100	0.00880		5748168
1,2,3,4,7,8,9-Hepta CDF **	pg	<1.2	1.2	10	2.0	0.0100	0.0120		5748168
1,2,3,4,6,7,8,9-Octa CDF **	pg	<0.99	0.99	100	5.0	0.000300	0.000297		5748168
Total Tetra CDF **	pg	<0.99	0.99	10	N/A			0	5748168
Total Penta CDF **	pg	<1.0	1.0	10	N/A			0	5748168
Total Hexa CDF **	pg	<1.0	1.0	10	N/A			0	5748168
Total Hepta CDF **	pg	<1.0	1.0	10	N/A			0	5748168
TOTAL TOXIC EQUIVALENCY	pg						3.37		

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

DIOXINS AND FURANS BY HRMS (AIR SAMPLING MEDIA)

Maxxam ID		HUA161							
Sampling Date		2018/09/18 17:11				**TOXIC EQUIVALENCY**		# of	
	UNITS	**TRAIN PROOF 1-8**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	106							5748168
C13-1234678 HeptaCDF **	%	100							5748168
C13-123678 HexaCDD *	%	77							5748168
C13-123678 HexaCDF **	%	94							5748168
C13-12378 PentaCDD *	%	101							5748168
C13-12378 PentaCDF **	%	102							5748168
C13-2378 TetraCDD *	%	109							5748168
C13-2378 TetraCDF **	%	91							5748168
C13-Octachlorodibenzo-p-Dioxin	%	122							5748168

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

TEST SUMMARY

Maxxam ID: HUA161
Sample ID: TRAIN PROOF 1-8
Matrix: Air Sampling Media

Collected: 2018/09/18
Shipped:
Received: 2018/09/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chlorobenzenes in MM5 Trains (EPA M0010)	GC/MS	5747460	2018/09/24	2018/09/24	Fan (Carrie) Jiang
Chlorophenols in MM5 Trains (EPA M0010)	GC/MS	5747742	2018/09/24	2018/09/26	Fan (Carrie) Jiang
Dioxins/Furans in Air (Method 23)	HRMS/MS	5748168	2018/09/24	2018/09/26	Angel Guerrero
PAH's in MM5 SamplingTrains (CARB429mod)	GC/MS	5747447	2018/09/24	2018/09/24	Fan (Carrie) Jiang
PCBs in a Sampling Train (1668Amod)	HRMS/MS	5748626	2018/09/24	2018/09/27	Cathy Xu

Maxxam ID: HUA161 Dup
Sample ID: TRAIN PROOF 1-8
Matrix: Air Sampling Media

Collected: 2018/09/18
Shipped:
Received: 2018/09/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Air (Method 23)	HRMS/MS	5748168	2018/09/24	2018/09/26	Angel Guerrero
PCBs in a Sampling Train (1668Amod)	HRMS/MS	5748626	2018/10/03	2018/09/27	Cathy Xu

Maxxam ID: HUA336
Sample ID: VOST PROOF 1-9
Matrix: Air Sampling Media

Collected: 2018/09/18
Shipped:
Received: 2018/09/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
VOST EPA5041A, 8260C for 0030, 0031	GC/MS	5754531	N/A	2018/09/27	Yujie Yan

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GENERAL COMMENTS

Results relate only to the items tested.

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Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5748168	AGU	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2018/09/26	NC		%	20
			1,2,3,7,8-Penta CDD	2018/09/26	NC		%	20
			1,2,3,4,7,8-Hexa CDD	2018/09/26	NC		%	20
			1,2,3,6,7,8-Hexa CDD	2018/09/26	NC		%	20
			1,2,3,7,8,9-Hexa CDD	2018/09/26	NC		%	20
			1,2,3,4,6,7,8-Hepta CDD	2018/09/26	NC		%	20
			1,2,3,4,6,7,8,9-Octa CDD	2018/09/26	NC		%	20
			Total Tetra CDD	2018/09/26	NC		%	20
			Total Penta CDD	2018/09/26	NC		%	20
			Total Hexa CDD	2018/09/26	NC		%	20
			Total Hepta CDD	2018/09/26	NC		%	20
			2,3,7,8-Tetra CDF	2018/09/26	NC		%	20
			1,2,3,7,8-Penta CDF	2018/09/26	NC		%	20
			2,3,4,7,8-Penta CDF	2018/09/26	NC		%	20
			1,2,3,4,7,8-Hexa CDF	2018/09/26	NC		%	20
			1,2,3,6,7,8-Hexa CDF	2018/09/26	NC		%	20
			2,3,4,6,7,8-Hexa CDF	2018/09/26	NC		%	20
			1,2,3,7,8,9-Hexa CDF	2018/09/26	NC		%	20
			1,2,3,4,6,7,8-Hepta CDF	2018/09/26	NC		%	20
			1,2,3,4,7,8,9-Hepta CDF	2018/09/26	NC		%	20
			1,2,3,4,6,7,8,9-Octa CDF	2018/09/26	NC		%	20
			Total Tetra CDF	2018/09/26	NC		%	20
			Total Penta CDF	2018/09/26	NC		%	20
			Total Hexa CDF	2018/09/26	NC		%	20
			Total Hepta CDF	2018/09/26	NC		%	20
5748626	CXU	RPD - Sample/Sample Dup	33'44'-TetraCB-(77)	2018/09/27	NC		%	30
			344'5-TetraCB-(81)	2018/09/27	NC		%	30
			233'44'-PentaCB-(105)	2018/09/27	NC		%	30
			2344'5-PentaCB-(114)	2018/09/27	NC		%	30
			23'44'5-PentaCB-(118)	2018/09/27	NC		%	30
			23'44'5'-PentaCB-(123)	2018/09/27	NC		%	30
			33'44'5-PentaCB-(126)	2018/09/27	NC		%	30
			HexaCB-(156)+(157)	2018/09/27	NC		%	30
			23'44'55'-HexaCB-(167)	2018/09/27	NC		%	30
			33'44'55'-HexaCB-(169)	2018/09/27	NC		%	30
			233'44'55'-HeptaCB-(189)	2018/09/27	NC		%	30

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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Maxxam Job #: B8O3742
Report Date: 2018/10/18

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARY'S BOWMANVILLE

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Branko Vrzic, A.SC.T., Senior Analyst, HRMS Services

Melanie Mabini, VOC Analyst

CHARTERED
Rodney A. Major
CHEMIST

Rodney Major, Manager Organic Processing Lab

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Site Location: ST. MARYS
Your C.O.C. #: 30742-30744

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/12/26
Report #: R5540133
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8X0884
Received: 2018/12/10, 10:21

Sample Matrix: Stack Sampling Train
Samples Received: 21

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Mercury 3C in HCl Rinse	7	2018/12/19	2018/12/21	BRL SOP-00104	EPA M29/M0060 m
Mercury 2B in HNO3/H2O2 Imp.	7	2018/12/17	2018/12/19	BRL SOP-00104	EPA M29/M0060 m
Mercury 3A in HNO3 Rinse	7	2018/12/17	2018/12/19	BRL SOP-00104	EPA M29/M0060 m
Mercury 3B in KMnO4/H2SO4 Imp.	7	2018/12/18	2018/12/20	BRL SOP-00104	EPA M29/M0060 m
Mercury 1B in Filter + Rinse (M29)	7	2018/12/17	2018/12/21	BRL SOP-00104	EPA 29 m
Hydrogen Halides -Midget H2SO4 Imp	7	2018/12/20	2018/12/20	BRL SOP-00108	EPA 26 m
Metals in Combined Train (6020B m)	7	2018/12/17	2018/12/18	BRL SOP-00103/ BRL SOP-00102	EPA M29/CARB 436 m
Ammonium in Midget H2SO4 Imp(CTM-027mod)	7	2018/12/17	2018/12/17	BRL SOP-00107	EPA CTM-027 m
>10um Particulates in Rinse	6	2018/12/12	2018/12/19	BRL SOP-00109	EPA M201A
2.5-10um Particulates in Rinse	6	2018/12/12	2018/12/19	BRL SOP-00109	EPA M201A
2.5 um Particulates on Filter	7	N/A	2018/12/12	BRL SOP-00109	EPA M201A
<2.5um Particulates in Rinse	6	2018/12/12	2018/12/19	BRL SOP-00109	EPA M201A
Particulates/Acetone Rinse (M5/315/M201)	7	2018/12/12	2018/12/17	BRL SOP-00109	EPA 5/315 m
Particulates/Filter (M5/315/NJATM1/M201)	7	N/A	2018/12/12	BRL SOP-00109	EPA 5/315/NJATM1 m
Final Volume of Acetone Probe Rinse	7	N/A	2018/12/17	BRL SOP-00109	
Final Volume of Acetone Probe Rinse	6	N/A	2018/12/19	BRL SOP-00109	
Volume of Sulfuric Acid Impinger	7	N/A	2018/12/17		

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

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Site Location: ST. MARYS
Your C.O.C. #: 30742-30744

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/12/26
Report #: R5540133
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8X0884
Received: 2018/12/10, 10:21

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769
==
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Maxxam Job #: B8X0884
Report Date: 2018/12/26

RWDI Air Inc
Site Location: ST. MARYS

RESULTS OF ANALYSES OF STACK SAMPLING TRAIN

Maxxam ID		INF781	INF782	INF783			
Sampling Date			2018/12/04	2018/12/05			
COC Number		30742-30744	30742-30744	30742-30744			
	UNITS	**M5/29 - BLANK**	**M5/29- ALTFUEL-T1**	**M5/29- ALTFUEL-T2**	**RDL**	**MDL**	**QC Batch**
Acetone Rinse Particulate Weight in Acetone Rinse	mg	0.8	84.7	30.8	0.5	0.1	5884530
Front Half Particulate Weight on Filter	mg	1.60	ND	ND	0.30	0.060	5885290
Acetone Rinse Volume	ml	66	83	57	1	1	5884533

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Maxxam ID		INF784	INF785	INF786			
Sampling Date		2018/12/06	2018/12/07	2018/12/07			
COC Number		30742-30744	30742-30744	30742-30744			
	UNITS	**M5/29- ALTFUEL-T3**	**M5/29- BASELINE-T1**	**M5/29- BASELINE-T2**	**RDL**	**MDL**	**QC Batch**
Acetone Rinse Particulate Weight in Acetone Rinse	mg	68.8	68.7	63.6	0.5	0.1	5884530
Front Half Particulate Weight on Filter	mg	1.80	0.30	ND	0.30	0.060	5885290
Acetone Rinse Volume	ml	110	94	81	1	1	5884533

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Maxxam ID		INF787				INF806			
Sampling Date		2018/12/08				2018/12/08			
COC Number		30742-30744				30742-30744			
	UNITS	**M5/29- BASELINE-T3**	**RDL**	**MDL**	**QC Batch**	**M26(M)/CTM027(M)-BLANK**	**RDL**	**MDL**	**QC Batch**
Acetone Rinse Particulate Weight in Acetone Rinse	mg	42.9	0.5	0.1	5884530				
Front Half Particulate Weight on Filter	mg	ND	0.30	0.060	5885290				
Acetone Rinse Volume	ml	75	1	1	5884533				
Sulfuric Acid Volume	ml					49	1	1	5891507
Ammonium (NH4)	ug					ND	3.8	0.76	5891505
Hydrochloric Acid	ug					32	30	6.0	5899471

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B8X0884
Report Date: 2018/12/26

RWDI Air Inc
Site Location: ST. MARYS

RESULTS OF ANALYSES OF STACK SAMPLING TRAIN

Maxxam ID		INF807	INF808	INF809			
Sampling Date		2018/12/04	2018/12/05	2018/12/06			
COC Number		30742-30744	30742-30744	30742-30744			
	UNITS	**M26(M)/CTM027(M)- AF- T1**	**M26(M)/CTM027(M)- AF- T2**	**M26(M)/CTM027(M)- AF- T3**	**RDL**	**MDL**	**QC Batch**
Sulfuric Acid Volume	ml	49	50	50	1	1	5891507
Ammonium (NH4)	ug	3100	2100	2300	38	7.6	5891505
Hydrochloric Acid	ug	1400	410	440	30	6.0	5899471

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		INF810	INF811	INF812			
Sampling Date		2018/12/07	2018/12/07	2018/12/08			
COC Number		30742-30744	30742-30744	30742-30744			
	UNITS	**M26(M)/CTM027(M)- BL- T1**	**M26(M)/CTM027(M)- BL- T2**	**M26(M)/CTM027(M)- BL- T3**	**RDL**	**MDL**	**QC Batch**
Sulfuric Acid Volume	ml	51	50	49	1	1	5891507
Ammonium (NH4)	ug	2100	2500	1200	38	7.6	5891505
Hydrochloric Acid	ug	500	170	140	30	6.0	5899471

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		INF828				INF829			
Sampling Date						2018/12/04			
COC Number		30742-30744				30742-30744			
	UNITS	**M201A- BLANK**	**RDL**	**MDL**	**QC Batch**	**M201A- ALTFUEL- T1**	**RDL**	**MDL**	**QC Batch**
> 10 Particulate Weight in Acetone Rinse	mg					1.9	0.5	0.1	5884543
< 2.5 Particulate Weight in Acetone Rinse	mg					0.6	0.5	0.5	5884541
2.5 - 10 Particulate Weight in Acetone Rinse	mg					1.2	0.5	0.5	5884542
< 2.5 Particulate Weight on Filter	mg	ND	0.30	0.30	5885289	ND	0.30	0.30	5885289
Acetone Rinse Volume (10)	ml					21	1	N/A	5884544
Acetone Rinse Volume (2.5 - 10)	ml					40	1	N/A	5884544
Acetone Rinse Volume (2.5)	ml					30	1	N/A	5884544

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

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Maxxam Job #: B8X0884
Report Date: 2018/12/26

RWDI Air Inc
Site Location: ST. MARYS

RESULTS OF ANALYSES OF STACK SAMPLING TRAIN

Maxxam ID		INF830	INF831	INF832			
Sampling Date		2018/12/05	2018/12/06	2018/12/07			
COC Number		30742-30744	30742-30744	30742-30744			
	UNITS	**M201A- ALTFUEL-T2**	**M201A- ALTFUEL-T3**	**M201A- BASELINE-T1**	**RDL**	**MDL**	**QC Batch**
> 10 Particulate Weight in Acetone Rinse	mg	1.0	1.8	2.5	0.5	0.1	5884543
< 2.5 Particulate Weight in Acetone Rinse	mg	ND	0.7	ND	0.5	0.5	5884541
2.5 - 10 Particulate Weight in Acetone Rinse	mg	1.0	1.6	1.1	0.5	0.5	5884542
< 2.5 Particulate Weight on Filter	mg	ND	ND	ND	0.30	0.30	5885289
Acetone Rinse Volume (10)	ml	27	23	28	1	N/A	5884544
Acetone Rinse Volume (2.5 - 10)	ml	31	44	38	1	N/A	5884544
Acetone Rinse Volume (2.5)	ml	15	22	22	1	N/A	5884544

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Maxxam ID		INF833	INF834			
Sampling Date		2018/12/07	2018/12/08			
COC Number		30742-30744	30742-30744			
	UNITS	**M201A- BASELINE-T2**	**M201A- BASELINE-T3**	**RDL**	**MDL**	**QC Batch**
> 10 Particulate Weight in Acetone Rinse	mg	2.0	2.3	0.5	0.1	5884543
< 2.5 Particulate Weight in Acetone Rinse	mg	0.6	0.5	0.5	0.5	5884541
2.5 - 10 Particulate Weight in Acetone Rinse	mg	0.8	1.1	0.5	0.5	5884542
< 2.5 Particulate Weight on Filter	mg	ND	ND	0.30	0.30	5885289
Acetone Rinse Volume (10)	ml	28	27	1	N/A	5884544
Acetone Rinse Volume (2.5 - 10)	ml	44	45	1	N/A	5884544
Acetone Rinse Volume (2.5)	ml	32	23	1	N/A	5884544

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

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Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B8X0884
Report Date: 2018/12/26

RWDI Air Inc
Site Location: ST. MARYS

MERCURY BY COLD VAPOUR AA (STACK SAMPLING TRAIN)

Maxxam ID		INF781			INF782			
Sampling Date					2018/12/04			
COC Number		30742-30744			30742-30744			
	UNITS	**M5/29 - BLANK**	**RDL**	**MDL**	**M5/29- ALTFUEL-T1**	**RDL**	**MDL**	**QC Batch**
1B Mercury (Hg)	ug	ND	0.015	0.006	0.816	0.015	0.006	5889150
2B Mercury (Hg)	ug	ND	0.05	0.002	1.52	0.05	0.002	5892353
3A Mercury (Hg)	ug	ND	0.0066	0.00079	0.133	0.0038	0.00046	5892375
3B Mercury (Hg)	ug	ND	0.02	0.004	0.361	0.023	0.0046	5894395
3C Mercury (Hg)	ug	ND	0.013	0.0026	2.39	0.02	0.004	5896424

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Maxxam ID		INF783			INF784			
Sampling Date		2018/12/05			2018/12/06			
COC Number		30742-30744			30742-30744			
	UNITS	**M5/29- ALTFUEL-T2**	**RDL**	**MDL**	**M5/29- ALTFUEL-T3**	**RDL**	**MDL**	**QC Batch**
1B Mercury (Hg)	ug	0.822	0.015	0.006	0.423	0.015	0.006	5889150
2B Mercury (Hg)	ug	1.40	0.05	0.002	0.76	0.05	0.002	5892353
3A Mercury (Hg)	ug	0.322	0.0038	0.00046	0.0784	0.0026	0.00031	5892375
3B Mercury (Hg)	ug	0.32	0.02	0.004	0.584	0.018	0.0036	5894395
3C Mercury (Hg)	ug	2.71	0.02	0.004	1.04	0.02	0.004	5896424

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		INF785			INF786			
Sampling Date		2018/12/07			2018/12/07			
COC Number		30742-30744			30742-30744			
	UNITS	**M5/29- BASELINE-T1**	**RDL**	**MDL**	**M5/29- BASELINE-T2**	**RDL**	**MDL**	**QC Batch**
1B Mercury (Hg)	ug	0.556	0.015	0.006	0.693	0.015	0.006	5889150
2B Mercury (Hg)	ug	0.62	0.05	0.002	0.60	0.05	0.002	5892353
3A Mercury (Hg)	ug	0.0746	0.0021	0.00025	0.0740	0.0028	0.00034	5892375
3B Mercury (Hg)	ug	0.74	0.02	0.004	0.35	0.02	0.004	5894395
3C Mercury (Hg)	ug	1.37	0.02	0.004	1.39	0.02	0.004	5896424

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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MERCURY BY COLD VAPOUR AA (STACK SAMPLING TRAIN)

Maxxam ID		INF787			
Sampling Date		2018/12/08			
COC Number		30742-30744			
	UNITS	**M5/29- BASELINE-T3**	**RDL**	**MDL**	**QC Batch**
1B Mercury (Hg)	ug	0.561	0.015	0.006	5889150
2B Mercury (Hg)	ug	0.55	0.05	0.002	5892353
3A Mercury (Hg)	ug	ND	0.0043	0.00052	5892375
3B Mercury (Hg)	ug	0.41	0.02	0.004	5894395
3C Mercury (Hg)	ug	1.22	0.025	0.005	5896424

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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ELEMENTS BY ICP/MS (STACK SAMPLING TRAIN)

Maxxam ID		INF781			INF782	INF783			
Sampling Date					2018/12/04	2018/12/05			
COC Number		30742-30744			30742-30744	30742-30744			
	UNITS	**M5/29 - BLANK**	**RDL**	**MDL**	**M5/29- ALTFUEL-T1**	**M5/29- ALTFUEL-T2**	**RDL**	**MDL**	**QC Batch**
Combined Train Aluminum (Al)	ug	133	60	3.0	384	247	150	7.5	5889155
Combined Train Antimony (Sb)	ug	ND	3.0	0.080	ND	ND	7.5	0.20	5889155
Combined Train Arsenic (As)	ug	ND	0.80	0.080	ND	ND	2.0	0.20	5889155
Combined Train Barium (Ba)	ug	20.5	1.2	0.80	33.1	23.8	3.0	2.0	5889155
Combined Train Beryllium (Be)	ug	ND	0.18	0.040	ND	ND	0.45	0.10	5889155
Combined Train Boron (B)	ug	ND	30	2.0	ND	ND	75	5.0	5889155
Combined Train Cadmium (Cd)	ug	ND	0.18	0.040	ND	ND	0.45	0.10	5889155
Combined Train Calcium (Ca)	ug	ND	300	18	2640	2110	750	45	5889155
Combined Train Chromium (Cr)	ug	ND	3.0	0.10	ND	ND	7.5	0.25	5889155
Combined Train Cobalt (Co)	ug	ND	0.18	0.020	0.48	ND	0.45	0.050	5889155
Combined Train Copper (Cu)	ug	1.5	1.5	0.20	6.1	ND	3.8	0.51	5889155
Combined Train Iron (Fe)	ug	ND	60	10	341	246	150	25	5889155
Combined Train Lead (Pb)	ug	1.05	0.60	0.040	4.5	3.9	1.5	0.10	5889155
Combined Train Magnesium (Mg)	ug	40	30	1.0	339	233	75	2.5	5889155
Combined Train Manganese (Mn)	ug	1.2	1.2	0.10	43.2	23.9	3.0	0.25	5889155
Combined Train Molybdenum (Mo)	ug	11.7	1.0	0.10	11.1	12.1	2.5	0.25	5889155
Combined Train Nickel (Ni)	ug	3.1	1.0	0.20	7.3	4.4	2.5	0.50	5889155
Combined Train Phosphorus (P)	ug	ND	90	10	ND	ND	230	26	5889155
Combined Train Potassium (K)	ug	ND	120	6.0	504	ND	300	15	5889155
Combined Train Selenium (Se)	ug	ND	2.0	0.50	ND	ND	5.0	1.3	5889155
Combined Train Silver (Ag)	ug	ND	0.24	0.040	ND	ND	0.60	0.10	5889155
Combined Train Strontium (Sr)	ug	1.64	0.90	0.060	8.6	6.8	2.3	0.15	5889155
Combined Train Thallium (Tl)	ug	ND	0.24	0.10	ND	ND	0.60	0.25	5889155
Combined Train Tin (Sn)	ug	42.2	1.2	0.10	44.9	48.6	3.0	0.25	5889155
Combined Train Titanium (Ti)	ug	21.8	3.0	0.30	30.8	25.8	7.5	0.75	5889155
Combined Train Vanadium (V)	ug	ND	0.60	0.080	ND	ND	1.5	0.20	5889155
Combined Train Zinc (Zn)	ug	ND	10	1.0	52	ND	25	2.5	5889155

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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ELEMENTS BY ICP/MS (STACK SAMPLING TRAIN)

Maxxam ID		INF784	INF785	INF786			
Sampling Date		2018/12/06	2018/12/07	2018/12/07			
COC Number		30742-30744	30742-30744	30742-30744			
	UNITS	**M5/29- ALTFUEL-T3**	**M5/29- BASELINE-T1**	**M5/29- BASELINE-T2**	**RDL**	**MDL**	**QC Batch**
Combined Train Aluminum (Al)	ug	311	212	232	150	7.5	5889155
Combined Train Antimony (Sb)	ug	ND	ND	ND	7.5	0.20	5889155
Combined Train Arsenic (As)	ug	ND	ND	ND	2.0	0.20	5889155
Combined Train Barium (Ba)	ug	28.3	25.1	25.4	3.0	2.0	5889155
Combined Train Beryllium (Be)	ug	ND	ND	ND	0.45	0.10	5889155
Combined Train Boron (B)	ug	ND	ND	ND	75	5.0	5889155
Combined Train Cadmium (Cd)	ug	ND	ND	ND	0.45	0.10	5889155
Combined Train Calcium (Ca)	ug	2270	1230	1370	750	45	5889155
Combined Train Chromium (Cr)	ug	ND	ND	ND	7.5	0.25	5889155
Combined Train Cobalt (Co)	ug	0.50	ND	ND	0.45	0.050	5889155
Combined Train Copper (Cu)	ug	6.7	ND	ND	3.8	0.51	5889155
Combined Train Iron (Fe)	ug	459	329	238	150	25	5889155
Combined Train Lead (Pb)	ug	4.9	2.1	3.4	1.5	0.10	5889155
Combined Train Magnesium (Mg)	ug	250	112	265	75	2.5	5889155
Combined Train Manganese (Mn)	ug	38.8	11.4	5.2	3.0	0.25	5889155
Combined Train Molybdenum (Mo)	ug	12.6	12.1	12.2	2.5	0.25	5889155
Combined Train Nickel (Ni)	ug	6.9	4.6	4.6	2.5	0.50	5889155
Combined Train Phosphorus (P)	ug	ND	ND	ND	230	26	5889155
Combined Train Potassium (K)	ug	387	ND	ND	300	15	5889155
Combined Train Selenium (Se)	ug	ND	ND	ND	5.0	1.3	5889155
Combined Train Silver (Ag)	ug	0.81	ND	0.89	0.60	0.10	5889155
Combined Train Strontium (Sr)	ug	6.8	3.2	3.5	2.3	0.15	5889155
Combined Train Thallium (Tl)	ug	ND	ND	ND	0.60	0.25	5889155
Combined Train Tin (Sn)	ug	54.1	34.3	45.0	3.0	0.25	5889155
Combined Train Titanium (Ti)	ug	26.0	20.9	24.3	7.5	0.75	5889155
Combined Train Vanadium (V)	ug	ND	ND	ND	1.5	0.20	5889155
Combined Train Zinc (Zn)	ug	49	ND	ND	25	2.5	5889155

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B8X0884
Report Date: 2018/12/26

RWDI Air Inc
Site Location: ST. MARYS

ELEMENTS BY ICP/MS (STACK SAMPLING TRAIN)

Maxxam ID		INF787			
Sampling Date		2018/12/08			
COC Number		30742-30744			
	UNITS	**M5/29- BASELINE-T3**	**RDL**	**MDL**	**QC Batch**
Combined Train Aluminum (Al)	ug	185	150	7.5	5889155
Combined Train Antimony (Sb)	ug	ND	7.5	0.20	5889155
Combined Train Arsenic (As)	ug	ND	2.0	0.20	5889155
Combined Train Barium (Ba)	ug	20.7	3.0	2.0	5889155
Combined Train Beryllium (Be)	ug	ND	0.45	0.10	5889155
Combined Train Boron (B)	ug	ND	75	5.0	5889155
Combined Train Cadmium (Cd)	ug	ND	0.45	0.10	5889155
Combined Train Calcium (Ca)	ug	922	750	45	5889155
Combined Train Chromium (Cr)	ug	ND	7.5	0.25	5889155
Combined Train Cobalt (Co)	ug	ND	0.45	0.050	5889155
Combined Train Copper (Cu)	ug	ND	3.8	0.51	5889155
Combined Train Iron (Fe)	ug	155	150	25	5889155
Combined Train Lead (Pb)	ug	2.1	1.5	0.10	5889155
Combined Train Magnesium (Mg)	ug	87	75	2.5	5889155
Combined Train Manganese (Mn)	ug	6.8	3.0	0.25	5889155
Combined Train Molybdenum (Mo)	ug	19.8	2.5	0.25	5889155
Combined Train Nickel (Ni)	ug	4.5	2.5	0.50	5889155
Combined Train Phosphorus (P)	ug	ND	230	26	5889155
Combined Train Potassium (K)	ug	ND	300	15	5889155
Combined Train Selenium (Se)	ug	ND	5.0	1.3	5889155
Combined Train Silver (Ag)	ug	ND	0.60	0.10	5889155
Combined Train Strontium (Sr)	ug	2.6	2.3	0.15	5889155
Combined Train Thallium (Tl)	ug	ND	0.60	0.25	5889155
Combined Train Tin (Sn)	ug	44.5	3.0	0.25	5889155
Combined Train Titanium (Ti)	ug	19.5	7.5	0.75	5889155
Combined Train Vanadium (V)	ug	ND	1.5	0.20	5889155
Combined Train Zinc (Zn)	ug	ND	25	2.5	5889155

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B8X0884
Report Date: 2018/12/26

RWDI Air Inc
Site Location: ST. MARYS

TEST SUMMARY

Maxxam ID: INF781
Sample ID: M5/29 - BLANK
Matrix: Stack Sampling Train

Collected:
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 3C in HCl Rinse	CV/AA	5896424	2018/12/19	2018/12/21	Meghaben Patel
Mercury 2B in HNO3/H2O2 Imp.	CV/AA	5892353	2018/12/17	2018/12/19	Meghaben Patel
Mercury 3A in HNO3 Rinse	CV/AA	5892375	2018/12/17	2018/12/19	Meghaben Patel
Mercury 3B in KMnO4/H2SO4 Imp.	CV/AA	5894395	2018/12/18	2018/12/20	Meghaben Patel
Mercury 1B in Filter + Rinse (M29)	CV/AA	5889150	2018/12/17	2018/12/21	Meghaben Patel
Metals in Combined Train (6020B m)	ICP1/MS	5889155	2018/12/17	2018/12/18	Nan Raykha
Particulates/Acetone Rinse (M5/315/M201)	BAL	5884530	2018/12/12	2018/12/17	Farag Farag
Particulates/Filter (M5/315/NJATM1/M201)	BAL	5885290	N/A	2018/12/12	Brenda Moore
Final Volume of Acetone Probe Rinse		5884533	N/A	2018/12/17	Farag Farag

Maxxam ID: INF782
Sample ID: M5/29- ALTFUEL- T1
Matrix: Stack Sampling Train

Collected: 2018/12/04
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 3C in HCl Rinse	CV/AA	5896424	2018/12/19	2018/12/21	Meghaben Patel
Mercury 2B in HNO3/H2O2 Imp.	CV/AA	5892353	2018/12/17	2018/12/19	Meghaben Patel
Mercury 3A in HNO3 Rinse	CV/AA	5892375	2018/12/17	2018/12/19	Meghaben Patel
Mercury 3B in KMnO4/H2SO4 Imp.	CV/AA	5894395	2018/12/18	2018/12/20	Meghaben Patel
Mercury 1B in Filter + Rinse (M29)	CV/AA	5889150	2018/12/17	2018/12/21	Meghaben Patel
Metals in Combined Train (6020B m)	ICP1/MS	5889155	2018/12/17	2018/12/18	Nan Raykha
Particulates/Acetone Rinse (M5/315/M201)	BAL	5884530	2018/12/12	2018/12/17	Farag Farag
Particulates/Filter (M5/315/NJATM1/M201)	BAL	5885290	N/A	2018/12/12	Brenda Moore
Final Volume of Acetone Probe Rinse		5884533	N/A	2018/12/17	Farag Farag

Maxxam ID: INF782 Dup
Sample ID: M5/29- ALTFUEL- T1
Matrix: Stack Sampling Train

Collected: 2018/12/04
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 3B in KMnO4/H2SO4 Imp.	CV/AA	5894395	2018/12/18	2018/12/20	Meghaben Patel
Metals in Combined Train (6020B m)	ICP1/MS	5889155	2018/12/18	2018/12/18	Nan Raykha

Maxxam ID: INF783
Sample ID: M5/29- ALTFUEL- T2
Matrix: Stack Sampling Train

Collected: 2018/12/05
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 3C in HCl Rinse	CV/AA	5896424	2018/12/19	2018/12/21	Meghaben Patel
Mercury 2B in HNO3/H2O2 Imp.	CV/AA	5892353	2018/12/17	2018/12/19	Meghaben Patel
Mercury 3A in HNO3 Rinse	CV/AA	5892375	2018/12/17	2018/12/19	Meghaben Patel
Mercury 3B in KMnO4/H2SO4 Imp.	CV/AA	5894395	2018/12/18	2018/12/20	Meghaben Patel
Mercury 1B in Filter + Rinse (M29)	CV/AA	5889150	2018/12/17	2018/12/21	Meghaben Patel
Metals in Combined Train (6020B m)	ICP1/MS	5889155	2018/12/17	2018/12/18	Nan Raykha
Particulates/Acetone Rinse (M5/315/M201)	BAL	5884530	2018/12/12	2018/12/17	Farag Farag
Particulates/Filter (M5/315/NJATM1/M201)	BAL	5885290	N/A	2018/12/12	Brenda Moore
Final Volume of Acetone Probe Rinse		5884533	N/A	2018/12/17	Farag Farag

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Maxxam Job #: B8X0884
Report Date: 2018/12/26

RWDI Air Inc
Site Location: ST. MARYS

TEST SUMMARY

Maxxam ID: INF783 Dup
Sample ID: M5/29- ALTFUEL- T2
Matrix: Stack Sampling Train

Collected: 2018/12/05
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 1B in Filter + Rinse (M29)	CV/AA	5889150	2018/12/18	2018/12/21	Meghaben Patel

Maxxam ID: INF784
Sample ID: M5/29- ALTFUEL- T3
Matrix: Stack Sampling Train

Collected: 2018/12/06
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 3C in HCl Rinse	CV/AA	5896424	2018/12/19	2018/12/21	Meghaben Patel
Mercury 2B in HNO3/H2O2 Imp.	CV/AA	5892353	2018/12/17	2018/12/19	Meghaben Patel
Mercury 3A in HNO3 Rinse	CV/AA	5892375	2018/12/17	2018/12/19	Meghaben Patel
Mercury 3B in KMnO4/H2SO4 Imp.	CV/AA	5894395	2018/12/18	2018/12/20	Meghaben Patel
Mercury 1B in Filter + Rinse (M29)	CV/AA	5889150	2018/12/17	2018/12/21	Meghaben Patel
Metals in Combined Train (6020B m)	ICP1/MS	5889155	2018/12/17	2018/12/18	Nan Raykha
Particulates/Acetone Rinse (M5/315/M201)	BAL	5884530	2018/12/12	2018/12/17	Farag Farag
Particulates/Filter (M5/315/NJATM1/M201)	BAL	5885290	N/A	2018/12/12	Brenda Moore
Final Volume of Acetone Probe Rinse		5884533	N/A	2018/12/17	Farag Farag

Maxxam ID: INF785
Sample ID: M5/29- BASELINE- T1
Matrix: Stack Sampling Train

Collected: 2018/12/07
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 3C in HCl Rinse	CV/AA	5896424	2018/12/19	2018/12/21	Meghaben Patel
Mercury 2B in HNO3/H2O2 Imp.	CV/AA	5892353	2018/12/17	2018/12/19	Meghaben Patel
Mercury 3A in HNO3 Rinse	CV/AA	5892375	2018/12/17	2018/12/19	Meghaben Patel
Mercury 3B in KMnO4/H2SO4 Imp.	CV/AA	5894395	2018/12/18	2018/12/20	Meghaben Patel
Mercury 1B in Filter + Rinse (M29)	CV/AA	5889150	2018/12/17	2018/12/21	Meghaben Patel
Metals in Combined Train (6020B m)	ICP1/MS	5889155	2018/12/17	2018/12/18	Nan Raykha
Particulates/Acetone Rinse (M5/315/M201)	BAL	5884530	2018/12/12	2018/12/17	Farag Farag
Particulates/Filter (M5/315/NJATM1/M201)	BAL	5885290	N/A	2018/12/12	Brenda Moore
Final Volume of Acetone Probe Rinse		5884533	N/A	2018/12/17	Farag Farag

Maxxam ID: INF785 Dup
Sample ID: M5/29- BASELINE- T1
Matrix: Stack Sampling Train

Collected: 2018/12/07
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 3C in HCl Rinse	CV/AA	5896424	2018/12/19	2018/12/21	Meghaben Patel

Maxxam ID: INF786
Sample ID: M5/29- BASELINE- T2
Matrix: Stack Sampling Train

Collected: 2018/12/07
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 3C in HCl Rinse	CV/AA	5896424	2018/12/19	2018/12/21	Meghaben Patel
Mercury 2B in HNO3/H2O2 Imp.	CV/AA	5892353	2018/12/17	2018/12/19	Meghaben Patel
Mercury 3A in HNO3 Rinse	CV/AA	5892375	2018/12/17	2018/12/19	Meghaben Patel

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Maxxam Job #: B8X0884
Report Date: 2018/12/26

RWDI Air Inc
Site Location: ST. MARYS

TEST SUMMARY

Maxxam ID: INF786
Sample ID: M5/29- BASELINE- T2
Matrix: Stack Sampling Train

Collected: 2018/12/07
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 3B in KMnO4/H2SO4 Imp.	CV/AA	5894395	2018/12/18	2018/12/20	Meghaben Patel
Mercury 1B in Filter + Rinse (M29)	CV/AA	5889150	2018/12/17	2018/12/21	Meghaben Patel
Metals in Combined Train (6020B m)	ICP1/MS	5889155	2018/12/17	2018/12/18	Nan Raykha
Particulates/Acetone Rinse (M5/315/M201)	BAL	5884530	2018/12/12	2018/12/17	Farag Farag
Particulates/Filter (M5/315/NJATM1/M201)	BAL	5885290	N/A	2018/12/12	Brenda Moore
Final Volume of Acetone Probe Rinse		5884533	N/A	2018/12/17	Farag Farag

Maxxam ID: INF786 Dup
Sample ID: M5/29- BASELINE- T2
Matrix: Stack Sampling Train

Collected: 2018/12/07
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 2B in HNO3/H2O2 Imp.	CV/AA	5892353	2018/12/17	2018/12/19	Meghaben Patel

Maxxam ID: INF787
Sample ID: M5/29- BASELINE- T3
Matrix: Stack Sampling Train

Collected: 2018/12/08
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 3C in HCl Rinse	CV/AA	5896424	2018/12/19	2018/12/21	Meghaben Patel
Mercury 2B in HNO3/H2O2 Imp.	CV/AA	5892353	2018/12/17	2018/12/19	Meghaben Patel
Mercury 3A in HNO3 Rinse	CV/AA	5892375	2018/12/17	2018/12/19	Meghaben Patel
Mercury 3B in KMnO4/H2SO4 Imp.	CV/AA	5894395	2018/12/18	2018/12/20	Meghaben Patel
Mercury 1B in Filter + Rinse (M29)	CV/AA	5889150	2018/12/17	2018/12/21	Meghaben Patel
Metals in Combined Train (6020B m)	ICP1/MS	5889155	2018/12/17	2018/12/18	Nan Raykha
Particulates/Acetone Rinse (M5/315/M201)	BAL	5884530	2018/12/12	2018/12/17	Farag Farag
Particulates/Filter (M5/315/NJATM1/M201)	BAL	5885290	N/A	2018/12/12	Brenda Moore
Final Volume of Acetone Probe Rinse		5884533	N/A	2018/12/17	Farag Farag

Maxxam ID: INF787 Dup
Sample ID: M5/29- BASELINE- T3
Matrix: Stack Sampling Train

Collected: 2018/12/08
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 3A in HNO3 Rinse	CV/AA	5892375	2018/12/17	2018/12/19	Meghaben Patel

Maxxam ID: INF806
Sample ID: M26(M)/CTM027(M)- BLANK
Matrix: Stack Sampling Train

Collected: 2018/12/08
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Halides -Midget H2SO4 Imp	IC/SPEC	5899471	2018/12/20	2018/12/20	Ann-Marie Stern
Ammonium in Midget H2SO4 Imp(CTM-027mod)	IC/SPEC	5891505	2018/12/17	2018/12/17	Rupinder Sihota
Volume of Sulfuric Acid Impinger		5891507	N/A	2018/12/17	Walt Wang

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Maxxam Job #: B8X0884
Report Date: 2018/12/26

RWDI Air Inc
Site Location: ST. MARYS

TEST SUMMARY

Maxxam ID: INF807
Sample ID: M26(M)/CTM027(M)- AF- T1
Matrix: Stack Sampling Train

Collected: 2018/12/04
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Halides -Midget H2SO4 Imp	IC/SPEC	5899471	2018/12/20	2018/12/20	Ann-Marie Stern
Ammonium in Midget H2SO4 Imp(CTM-027mod)	IC/SPEC	5891505	2018/12/17	2018/12/17	Rupinder Sihota
Volume of Sulfuric Acid Impinger		5891507	N/A	2018/12/17	Walt Wang

Maxxam ID: INF807 Dup
Sample ID: M26(M)/CTM027(M)- AF- T1
Matrix: Stack Sampling Train

Collected: 2018/12/04
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Halides -Midget H2SO4 Imp	IC/SPEC	5899471	2018/12/20	2018/12/20	Ann-Marie Stern

Maxxam ID: INF808
Sample ID: M26(M)/CTM027(M)- AF- T2
Matrix: Stack Sampling Train

Collected: 2018/12/05
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Halides -Midget H2SO4 Imp	IC/SPEC	5899471	2018/12/20	2018/12/20	Ann-Marie Stern
Ammonium in Midget H2SO4 Imp(CTM-027mod)	IC/SPEC	5891505	2018/12/17	2018/12/17	Rupinder Sihota
Volume of Sulfuric Acid Impinger		5891507	N/A	2018/12/17	Walt Wang

Maxxam ID: INF808 Dup
Sample ID: M26(M)/CTM027(M)- AF- T2
Matrix: Stack Sampling Train

Collected: 2018/12/05
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Ammonium in Midget H2SO4 Imp(CTM-027mod)	IC/SPEC	5891505	2018/12/17	2018/12/17	Rupinder Sihota

Maxxam ID: INF809
Sample ID: M26(M)/CTM027(M)- AF- T3
Matrix: Stack Sampling Train

Collected: 2018/12/06
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Halides -Midget H2SO4 Imp	IC/SPEC	5899471	2018/12/20	2018/12/20	Ann-Marie Stern
Ammonium in Midget H2SO4 Imp(CTM-027mod)	IC/SPEC	5891505	2018/12/17	2018/12/17	Rupinder Sihota
Volume of Sulfuric Acid Impinger		5891507	N/A	2018/12/17	Walt Wang

Maxxam ID: INF810
Sample ID: M26(M)/CTM027(M)- BL- T1
Matrix: Stack Sampling Train

Collected: 2018/12/07
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Halides -Midget H2SO4 Imp	IC/SPEC	5899471	2018/12/20	2018/12/20	Ann-Marie Stern
Ammonium in Midget H2SO4 Imp(CTM-027mod)	IC/SPEC	5891505	2018/12/17	2018/12/17	Rupinder Sihota
Volume of Sulfuric Acid Impinger		5891507	N/A	2018/12/17	Walt Wang

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TEST SUMMARY

Maxxam ID: INF811
Sample ID: M26(M)/CTM027(M)- BL- T2
Matrix: Stack Sampling Train

Collected: 2018/12/07
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Halides -Midget H2SO4 Imp	IC/SPEC	5899471	2018/12/20	2018/12/20	Ann-Marie Stern
Ammonium in Midget H2SO4 Imp(CTM-027mod)	IC/SPEC	5891505	2018/12/17	2018/12/17	Rupinder Sihota
Volume of Sulfuric Acid Impinger		5891507	N/A	2018/12/17	Walt Wang

Maxxam ID: INF812
Sample ID: M26(M)/CTM027(M)- BL- T3
Matrix: Stack Sampling Train

Collected: 2018/12/08
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Halides -Midget H2SO4 Imp	IC/SPEC	5899471	2018/12/20	2018/12/20	Ann-Marie Stern
Ammonium in Midget H2SO4 Imp(CTM-027mod)	IC/SPEC	5891505	2018/12/17	2018/12/17	Rupinder Sihota
Volume of Sulfuric Acid Impinger		5891507	N/A	2018/12/17	Walt Wang

Maxxam ID: INF828
Sample ID: M201A- BLANK
Matrix: Stack Sampling Train

Collected:
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
2.5 um Particulates on Filter	BAL	5885289	N/A	2018/12/12	Brenda Moore

Maxxam ID: INF829
Sample ID: M201A- ALTFUEL- T1
Matrix: Stack Sampling Train

Collected: 2018/12/04
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
>10um Particulates in Rinse	BAL	5884543	2018/12/12	2018/12/19	Farag Farag
2.5-10um Particulates in Rinse	BAL	5884542	2018/12/12	2018/12/19	Farag Farag
2.5 um Particulates on Filter	BAL	5885289	N/A	2018/12/12	Brenda Moore
<2.5um Particulates in Rinse	BAL	5884541	2018/12/12	2018/12/19	Farag Farag
Final Volume of Acetone Probe Rinse		5884544	N/A	2018/12/19	Farag Farag

Maxxam ID: INF830
Sample ID: M201A- ALTFUEL- T2
Matrix: Stack Sampling Train

Collected: 2018/12/05
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
>10um Particulates in Rinse	BAL	5884543	2018/12/12	2018/12/19	Farag Farag
2.5-10um Particulates in Rinse	BAL	5884542	2018/12/12	2018/12/19	Farag Farag
2.5 um Particulates on Filter	BAL	5885289	N/A	2018/12/12	Brenda Moore
<2.5um Particulates in Rinse	BAL	5884541	2018/12/12	2018/12/19	Farag Farag
Final Volume of Acetone Probe Rinse		5884544	N/A	2018/12/19	Farag Farag

Maxxam ID: INF831
Sample ID: M201A- ALTFUEL- T3
Matrix: Stack Sampling Train

Collected: 2018/12/06
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
>10um Particulates in Rinse	BAL	5884543	2018/12/12	2018/12/19	Farag Farag

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TEST SUMMARY

Maxxam ID: INF831
Sample ID: M201A- ALTFUEL- T3
Matrix: Stack Sampling Train

Collected: 2018/12/06
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
2.5-10um Particulates in Rinse	BAL	5884542	2018/12/12	2018/12/19	Farag Farag
2.5 um Particulates on Filter	BAL	5885289	N/A	2018/12/12	Brenda Moore
<2.5um Particulates in Rinse	BAL	5884541	2018/12/12	2018/12/19	Farag Farag
Final Volume of Acetone Probe Rinse		5884544	N/A	2018/12/19	Farag Farag

Maxxam ID: INF832
Sample ID: M201A- BASELINE- T1
Matrix: Stack Sampling Train

Collected: 2018/12/07
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
>10um Particulates in Rinse	BAL	5884543	2018/12/12	2018/12/19	Farag Farag
2.5-10um Particulates in Rinse	BAL	5884542	2018/12/12	2018/12/19	Farag Farag
2.5 um Particulates on Filter	BAL	5885289	N/A	2018/12/12	Brenda Moore
<2.5um Particulates in Rinse	BAL	5884541	2018/12/12	2018/12/19	Farag Farag
Final Volume of Acetone Probe Rinse		5884544	N/A	2018/12/19	Farag Farag

Maxxam ID: INF833
Sample ID: M201A- BASELINE- T2
Matrix: Stack Sampling Train

Collected: 2018/12/07
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
>10um Particulates in Rinse	BAL	5884543	2018/12/12	2018/12/19	Farag Farag
2.5-10um Particulates in Rinse	BAL	5884542	2018/12/12	2018/12/19	Farag Farag
2.5 um Particulates on Filter	BAL	5885289	N/A	2018/12/12	Brenda Moore
<2.5um Particulates in Rinse	BAL	5884541	2018/12/12	2018/12/19	Farag Farag
Final Volume of Acetone Probe Rinse		5884544	N/A	2018/12/19	Farag Farag

Maxxam ID: INF834
Sample ID: M201A- BASELINE- T3
Matrix: Stack Sampling Train

Collected: 2018/12/08
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
>10um Particulates in Rinse	BAL	5884543	2018/12/12	2018/12/19	Farag Farag
2.5-10um Particulates in Rinse	BAL	5884542	2018/12/12	2018/12/19	Farag Farag
2.5 um Particulates on Filter	BAL	5885289	N/A	2018/12/12	Brenda Moore
<2.5um Particulates in Rinse	BAL	5884541	2018/12/12	2018/12/19	Farag Farag
Final Volume of Acetone Probe Rinse		5884544	N/A	2018/12/19	Farag Farag

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GENERAL COMMENTS

Sample INF782 [M5/29- ALTFUEL- T1] : Negative weight observed

Sample INF783 [M5/29- ALTFUEL- T2] : Negative weight observed

Sample INF786 [M5/29- BASELINE- T2] : Negative weight observed

Sample INF787 [M5/29- BASELINE- T3] : Negative weight observed

Sample INF829 [M201A- ALTFUEL- T1] : LFT Loose filter material in the petri dish
DE Edges of the filter are frayed

Sample INF830 [M201A- ALTFUEL- T2] : FT Filter torn

Sample INF832 [M201A- BASELINE- T1] : FT Filter torn

ELEMENTS BY ICP/MS (STACK SAMPLING TRAIN)

Metals in Combined Train (6020B m): Extra dilution was required for all samples except sample INF781, due to the matrix (high Sulphur content).
Post digestion duplicate and spike were done on sample INF782.
Trace level Ba (3.3 ug) was observed in the Processed Blank.

Results relate only to the items tested.

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Site Location: ST. MARYS

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5884530	FF	Method Blank	Acetone Rinse Particulate Weight in Acetone Rinse	2018/12/17	ND, RDL=0.5		mg	
5884541	FF	Method Blank	< 2.5 Particulate Weight in Acetone Rinse	2018/12/19	ND, RDL=0.5		mg	
5884542	FF	Method Blank	2.5 - 10 Particulate Weight in Acetone Rinse	2018/12/19	ND, RDL=0.5		mg	
5884543	FF	Method Blank	> 10 Particulate Weight in Acetone Rinse	2018/12/19	ND, RDL=0.5		mg	
5889150	MPD	Reagent Blank	1B Mercury (Hg)	2018/12/21	ND, RDL=0.013		ug	
5889150	MPD	Matrix Spike(INF783)	1B Mercury (Hg)	2018/12/21		68 (1)	%	85 - 115
5889150	MPD	MS/MSD RPD	1B Mercury (Hg)	2018/12/21	22 (1)		%	20
5889150	MPD	Spiked Blank	1B Mercury (Hg)	2018/12/21		98	%	90 - 110
5889150	MPD	RPD	1B Mercury (Hg)	2018/12/21	0		%	20
5889150	MPD	Method Blank	1B Mercury (Hg)	2018/12/21	ND, RDL=0.015		ug	
5889150	MPD	RPD - Sample/Sample Dup	1B Mercury (Hg)	2018/12/21	6.1		%	20
5889155	N_R	Matrix Spike(INF782)	Combined Train Aluminum (Al)	2018/12/18		95	%	75 - 125
			Combined Train Antimony (Sb)	2018/12/18		100	%	75 - 125
			Combined Train Arsenic (As)	2018/12/18		98	%	75 - 125
			Combined Train Barium (Ba)	2018/12/18		96	%	75 - 125
			Combined Train Beryllium (Be)	2018/12/18		97	%	75 - 125
			Combined Train Boron (B)	2018/12/18		96	%	75 - 125
			Combined Train Cadmium (Cd)	2018/12/18		101	%	75 - 125
			Combined Train Calcium (Ca)	2018/12/18		93	%	75 - 125
			Combined Train Chromium (Cr)	2018/12/18		97	%	75 - 125
			Combined Train Cobalt (Co)	2018/12/18		102	%	75 - 125
			Combined Train Copper (Cu)	2018/12/18		101	%	75 - 125
			Combined Train Iron (Fe)	2018/12/18		103	%	75 - 125
			Combined Train Lead (Pb)	2018/12/18		106	%	75 - 125
			Combined Train Magnesium (Mg)	2018/12/18		99	%	75 - 125
			Combined Train Manganese (Mn)	2018/12/18		98	%	75 - 125
			Combined Train Molybdenum (Mo)	2018/12/18		99	%	75 - 125
			Combined Train Nickel (Ni)	2018/12/18		100	%	75 - 125
			Combined Train Phosphorus (P)	2018/12/18		98	%	75 - 125
			Combined Train Potassium (K)	2018/12/18		95	%	75 - 125
			Combined Train Selenium (Se)	2018/12/18		99	%	75 - 125
			Combined Train Silver (Ag)	2018/12/18		101	%	75 - 125
			Combined Train Strontium (Sr)	2018/12/18		96	%	75 - 125
			Combined Train Thallium (Tl)	2018/12/18		104	%	75 - 125
			Combined Train Tin (Sn)	2018/12/18		101	%	75 - 125
			Combined Train Titanium (Ti)	2018/12/18		93	%	75 - 125
			Combined Train Vanadium (V)	2018/12/18		97	%	75 - 125
			Combined Train Zinc (Zn)	2018/12/18		99	%	75 - 125
5889155	N_R	MS/MSD RPD	Combined Train Aluminum (Al)	2018/12/18	0		%	20
			Combined Train Antimony (Sb)	2018/12/18	0.55		%	20
			Combined Train Arsenic (As)	2018/12/18	2.3		%	20
			Combined Train Barium (Ba)	2018/12/18	1.5		%	20
			Combined Train Beryllium (Be)	2018/12/18	2.0		%	20
			Combined Train Boron (B)	2018/12/18	0.66		%	20
			Combined Train Cadmium (Cd)	2018/12/18	0.32		%	20
			Combined Train Calcium (Ca)	2018/12/18	0		%	20
			Combined Train Chromium (Cr)	2018/12/18	1.3		%	20
			Combined Train Cobalt (Co)	2018/12/18	0.61		%	20
			Combined Train Copper (Cu)	2018/12/18	2.1		%	20

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Combined Train Iron (Fe)	2018/12/18	0		%	20
			Combined Train Lead (Pb)	2018/12/18	2.6		%	20
			Combined Train Magnesium (Mg)	2018/12/18	2.4		%	20
			Combined Train Manganese (Mn)	2018/12/18	2.0		%	20
			Combined Train Molybdenum (Mo)	2018/12/18	1.4		%	20
			Combined Train Nickel (Ni)	2018/12/18	0.85		%	20
			Combined Train Phosphorus (P)	2018/12/18	0		%	20
			Combined Train Potassium (K)	2018/12/18	0		%	20
			Combined Train Selenium (Se)	2018/12/18	1.5		%	20
			Combined Train Silver (Ag)	2018/12/18	0.15		%	20
			Combined Train Strontium (Sr)	2018/12/18	3.8		%	20
			Combined Train Thallium (Tl)	2018/12/18	1.6		%	20
			Combined Train Tin (Sn)	2018/12/18	0.11		%	20
			Combined Train Titanium (Ti)	2018/12/18	0.58		%	20
			Combined Train Vanadium (V)	2018/12/18	0.95		%	20
			Combined Train Zinc (Zn)	2018/12/18	2.0		%	20
5889155	N_R	Spiked Blank	Combined Train Aluminum (Al)	2018/12/18		104	%	85 - 115
			Combined Train Antimony (Sb)	2018/12/18		103	%	85 - 115
			Combined Train Arsenic (As)	2018/12/18		100	%	85 - 115
			Combined Train Barium (Ba)	2018/12/18		104	%	85 - 115
			Combined Train Beryllium (Be)	2018/12/18		100	%	85 - 115
			Combined Train Boron (B)	2018/12/18		110	%	85 - 115
			Combined Train Cadmium (Cd)	2018/12/18		103	%	85 - 115
			Combined Train Calcium (Ca)	2018/12/18		98	%	85 - 115
			Combined Train Chromium (Cr)	2018/12/18		100	%	85 - 115
			Combined Train Cobalt (Co)	2018/12/18		102	%	85 - 115
			Combined Train Copper (Cu)	2018/12/18		103	%	85 - 115
			Combined Train Iron (Fe)	2018/12/18		107	%	85 - 115
			Combined Train Lead (Pb)	2018/12/18		101	%	85 - 115
			Combined Train Magnesium (Mg)	2018/12/18		101	%	85 - 115
			Combined Train Manganese (Mn)	2018/12/18		103	%	85 - 115
			Combined Train Molybdenum (Mo)	2018/12/18		103	%	85 - 115
			Combined Train Nickel (Ni)	2018/12/18		100	%	85 - 115
			Combined Train Phosphorus (P)	2018/12/18		107	%	85 - 115
			Combined Train Potassium (K)	2018/12/18		101	%	85 - 115
			Combined Train Selenium (Se)	2018/12/18		100	%	85 - 115
			Combined Train Silver (Ag)	2018/12/18		105	%	85 - 115
			Combined Train Strontium (Sr)	2018/12/18		102	%	85 - 115
			Combined Train Thallium (Tl)	2018/12/18		101	%	85 - 115
			Combined Train Tin (Sn)	2018/12/18		103	%	85 - 115
			Combined Train Titanium (Ti)	2018/12/18		100	%	85 - 115
			Combined Train Vanadium (V)	2018/12/18		101	%	85 - 115
			Combined Train Zinc (Zn)	2018/12/18		100	%	85 - 115
5889155	N_R	RPD	Combined Train Aluminum (Al)	2018/12/18	0.86		%	20
			Combined Train Antimony (Sb)	2018/12/18	1.0		%	20
			Combined Train Arsenic (As)	2018/12/18	1.8		%	20
			Combined Train Barium (Ba)	2018/12/18	1.3		%	20
			Combined Train Beryllium (Be)	2018/12/18	1.5		%	20
			Combined Train Boron (B)	2018/12/18	8.0		%	20
			Combined Train Cadmium (Cd)	2018/12/18	0.86		%	20
			Combined Train Calcium (Ca)	2018/12/18	0		%	20
			Combined Train Chromium (Cr)	2018/12/18	2.9		%	20
			Combined Train Cobalt (Co)	2018/12/18	2.6		%	20
			Combined Train Copper (Cu)	2018/12/18	0.86		%	20
			Combined Train Iron (Fe)	2018/12/18	2.2		%	20

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Combined Train Lead (Pb)	2018/12/18	3.4		%	20
			Combined Train Magnesium (Mg)	2018/12/18	1.8		%	20
			Combined Train Manganese (Mn)	2018/12/18	1.1		%	20
			Combined Train Molybdenum (Mo)	2018/12/18	1.4		%	20
			Combined Train Nickel (Ni)	2018/12/18	2.3		%	20
			Combined Train Phosphorus (P)	2018/12/18	0.88		%	20
			Combined Train Potassium (K)	2018/12/18	0		%	20
			Combined Train Selenium (Se)	2018/12/18	2.0		%	20
			Combined Train Silver (Ag)	2018/12/18	0.69		%	20
			Combined Train Strontium (Sr)	2018/12/18	1.8		%	20
			Combined Train Thallium (Tl)	2018/12/18	2.1		%	20
			Combined Train Tin (Sn)	2018/12/18	2.0		%	20
			Combined Train Titanium (Ti)	2018/12/18	1.1		%	20
			Combined Train Vanadium (V)	2018/12/18	1.8		%	20
			Combined Train Zinc (Zn)	2018/12/18	1.6		%	20
5889155	N_R	Method Blank	Combined Train Aluminum (Al)	2018/12/18	ND, RDL=60		ug	
			Combined Train Antimony (Sb)	2018/12/18	ND, RDL=3.0		ug	
			Combined Train Arsenic (As)	2018/12/18	ND, RDL=0.80		ug	
			Combined Train Barium (Ba)	2018/12/18	3.3, RDL=1.2		ug	
			Combined Train Beryllium (Be)	2018/12/18	ND, RDL=0.18		ug	
			Combined Train Boron (B)	2018/12/18	ND, RDL=30		ug	
			Combined Train Cadmium (Cd)	2018/12/18	ND, RDL=0.18		ug	
			Combined Train Calcium (Ca)	2018/12/18	ND, RDL=300		ug	
			Combined Train Chromium (Cr)	2018/12/18	ND, RDL=3.0		ug	
			Combined Train Cobalt (Co)	2018/12/18	ND, RDL=0.18		ug	
			Combined Train Copper (Cu)	2018/12/18	ND, RDL=1.5		ug	
			Combined Train Iron (Fe)	2018/12/18	ND, RDL=60		ug	
			Combined Train Lead (Pb)	2018/12/18	ND, RDL=0.60		ug	
			Combined Train Magnesium (Mg)	2018/12/18	ND, RDL=30		ug	
			Combined Train Manganese (Mn)	2018/12/18	ND, RDL=1.2		ug	
			Combined Train Molybdenum (Mo)	2018/12/18	ND, RDL=1.0		ug	
			Combined Train Nickel (Ni)	2018/12/18	ND, RDL=1.0		ug	
			Combined Train Phosphorus (P)	2018/12/18	ND, RDL=90		ug	
			Combined Train Potassium (K)	2018/12/18	ND, RDL=120		ug	
			Combined Train Selenium (Se)	2018/12/18	ND, RDL=2.0		ug	

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Maxxam Job #: B8X0884
Report Date: 2018/12/26

RWDI Air Inc
Site Location: ST. MARYS

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Combined Train Silver (Ag)	2018/12/18	ND, RDL=0.24		ug	
			Combined Train Strontium (Sr)	2018/12/18	ND, RDL=0.90		ug	
			Combined Train Thallium (Tl)	2018/12/18	ND, RDL=0.24		ug	
			Combined Train Tin (Sn)	2018/12/18	ND, RDL=1.2		ug	
			Combined Train Titanium (Ti)	2018/12/18	ND, RDL=3.0		ug	
			Combined Train Vanadium (V)	2018/12/18	ND, RDL=0.60		ug	
			Combined Train Zinc (Zn)	2018/12/18	ND, RDL=10		ug	
5889155	N_R	RPD - Sample/Sample Dup	Combined Train Aluminum (Al)	2018/12/18	5.6		%	20
			Combined Train Antimony (Sb)	2018/12/18	NC		%	20
			Combined Train Arsenic (As)	2018/12/18	NC		%	20
			Combined Train Barium (Ba)	2018/12/18	2.0		%	20
			Combined Train Beryllium (Be)	2018/12/18	NC		%	20
			Combined Train Boron (B)	2018/12/18	NC		%	20
			Combined Train Cadmium (Cd)	2018/12/18	NC		%	20
			Combined Train Calcium (Ca)	2018/12/18	6.5		%	20
			Combined Train Chromium (Cr)	2018/12/18	NC		%	20
			Combined Train Cobalt (Co)	2018/12/18	3.5		%	20
			Combined Train Copper (Cu)	2018/12/18	7.8		%	20
			Combined Train Iron (Fe)	2018/12/18	0.99		%	20
			Combined Train Lead (Pb)	2018/12/18	6.8		%	20
			Combined Train Magnesium (Mg)	2018/12/18	2.6		%	20
			Combined Train Manganese (Mn)	2018/12/18	2.0		%	20
			Combined Train Molybdenum (Mo)	2018/12/18	2.2		%	20
			Combined Train Nickel (Ni)	2018/12/18	4.9		%	20
			Combined Train Phosphorus (P)	2018/12/18	NC		%	20
			Combined Train Potassium (K)	2018/12/18	15		%	20
			Combined Train Selenium (Se)	2018/12/18	NC		%	20
			Combined Train Silver (Ag)	2018/12/18	NC		%	20
			Combined Train Strontium (Sr)	2018/12/18	4.9		%	20
			Combined Train Thallium (Tl)	2018/12/18	NC		%	20
			Combined Train Tin (Sn)	2018/12/18	2.8		%	20
			Combined Train Titanium (Ti)	2018/12/18	2.6		%	20
			Combined Train Vanadium (V)	2018/12/18	NC		%	20
			Combined Train Zinc (Zn)	2018/12/18	4.6		%	20
5891505	RSU	Matrix Spike(INF808)	Ammonium (NH4)	2018/12/17		89	%	75 - 125
5891505	RSU	Spiked Blank	Ammonium (NH4)	2018/12/17		100	%	90 - 110
5891505	RSU	Method Blank	Ammonium (NH4)	2018/12/17	ND, RDL=3.8		ug	
5891505	RSU	RPD - Sample/Sample Dup	Ammonium (NH4)	2018/12/17	2.0		%	20
5892353	MPD	Matrix Spike(INF786)	2B Mercury (Hg)	2018/12/19		97	%	85 - 115
5892353	MPD	MS/MSD RPD	2B Mercury (Hg)	2018/12/19	2.7		%	20
5892353	MPD	Spiked Blank	2B Mercury (Hg)	2018/12/19		102	%	90 - 110
5892353	MPD	RPD	2B Mercury (Hg)	2018/12/19	1.2		%	20
5892353	MPD	Method Blank	2B Mercury (Hg)	2018/12/19	ND, RDL=0.05		ug	
5892353	MPD	RPD - Sample/Sample Dup	2B Mercury (Hg)	2018/12/19	7.6		%	20
5892375	MPD	Matrix Spike(INF787)	3A Mercury (Hg)	2018/12/19		102	%	85 - 115
5892375	MPD	MS/MSD RPD	3A Mercury (Hg)	2018/12/19	0.59		%	20

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5892375	MPD	Spiked Blank	3A Mercury (Hg)	2018/12/19		101	%	90 - 110
5892375	MPD	RPD	3A Mercury (Hg)	2018/12/19	0.88		%	20
5892375	MPD	Method Blank	3A Mercury (Hg)	2018/12/19	ND, RDL=0.005		ug	
5892375	MPD	RPD - Sample/Sample Dup	3A Mercury (Hg)	2018/12/19	NC		%	20
5894395	MPD	Reagent Blank	3B Mercury (Hg)	2018/12/20	ND, RDL=0.013		ug	
5894395	MPD	Matrix Spike(INF782)	3B Mercury (Hg)	2018/12/20		104	%	85 - 115
5894395	MPD	MS/MSD RPD	3B Mercury (Hg)	2018/12/20	2.8		%	20
5894395	MPD	Spiked Blank	3B Mercury (Hg)	2018/12/20		97	%	90 - 110
5894395	MPD	RPD	3B Mercury (Hg)	2018/12/20	1.7		%	20
5894395	MPD	Method Blank	3B Mercury (Hg)	2018/12/20	ND, RDL=0.02		ug	
5894395	MPD	RPD - Sample/Sample Dup	3B Mercury (Hg)	2018/12/20	0.61		%	20
5896424	MPD	Reagent Blank	3C Mercury (Hg)	2018/12/21	ND, RDL=0.013		ug	
5896424	MPD	Matrix Spike(INF785)	3C Mercury (Hg)	2018/12/21		81 (1)	%	85 - 115
5896424	MPD	MS/MSD RPD	3C Mercury (Hg)	2018/12/21	1.9 (1)		%	20
5896424	MPD	Spiked Blank	3C Mercury (Hg)	2018/12/21		101	%	90 - 110
5896424	MPD	RPD	3C Mercury (Hg)	2018/12/21	2.3		%	20
5896424	MPD	Method Blank	3C Mercury (Hg)	2018/12/21	ND, RDL=0.013		ug	
5896424	MPD	RPD - Sample/Sample Dup	3C Mercury (Hg)	2018/12/21	0.82		%	20
5899471	A_S	Matrix Spike(INF807)	Hydrochloric Acid	2018/12/20		89	%	80 - 120
5899471	A_S	Spiked Blank	Hydrochloric Acid	2018/12/20		100	%	90 - 110
5899471	A_S	Method Blank	Hydrochloric Acid	2018/12/20	ND, RDL=30		ug	
5899471	A_S	RPD - Sample/Sample Dup	Hydrochloric Acid	2018/12/20	0.036		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Reagent Blank: A blank matrix containing all reagents used in the analytical procedure. Used to determine any analytical contamination.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Matrix spike recovery was low and confirmed by post spike, possibly due to matrix effect.

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Frank Mo, B.Sc., Inorganic Lab. Manager

John Bowman, Supervisor, Metals Group

Walt Wang, Scientific Specialist – Inorganic

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

B8X0884 (M5/M29/CT827/M26/M201A)

Chain of Custody Form - AIR

30742

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B8X0018 (VOST)

CAM FCD-01302 /2

Page 9 of 11

ANALYSIS REQUESTED

CLIENT INFORMATION

SECTION

Company Name: RWDI
Project Manager:
e-mail:
Address:

Phone: Fax:

Sampled by:

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time	ENV. CANADA PM 12	USEPA M26	U.S. EPA SW846 0030 VOST										
SVOC-ALP-T1 (6 SAMPLES)			12/04		✓												
SVOC-ALP-T2			12/05		✓												
SVOC-ALP-T3			12/06		✓												
SVOC-BASELINE-T1			12/07		✓												
SVOC-BASELINE-T2			12/07		✓												
SVOC-BASELINE-T3			12/08		✓												
SVOC-BLANK			[illegible]		✓												
M26-T1-T3-ALP (3 SAMPLES)			12/04-06			✓											
~~VOS~~ M26-T1-T3-BASELINE (3 SAMPLES)			12/07-08			✓											
VOST-T1-T3-ALP (6 SAMPLES)			12/04-06				✓										
VOST-T1-T3-BASELINE (6 SAMPLES)			12/07~~+08~~				✓										
VOST BLANK			N/A				✓										

TAT Requirement

STD 10 Business day ☑
Rush 5 Business day * ☐
Rush 2 Business day * ☐
* need approval from Maxxam

PROJECT INFORMATION

Project #:
Name:
PO #:
Maxxam Quote #:
Maxxam Contact:

REPORTING REQUIREMENTS

Summary Report only ☐
EDD ☐

Regulation

Notes

Please note if this samples are "Industrial Hygiene" samples
If submitting dustfall samples, please indicate the diameter of the jar opening in cm.

PROJECT SPECIFIC COMMENTS

Client Signature:
Affiliation:
Date/Time:

Received by: See Page 1
Affiliation:
Date/Time:

No ice 20.1/20.0/20.1
No ice 19.3/19.9/19.4

COC-1031 (11/2017)

[illegible] 2018/12/10 10:21 5.3/5.7/6.2 °C 12.0/17.7/13.1

88X0884 (M5/M29/CTM027/M26/M201A)

Chain of Custody Form - AIR

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CAM FCD-01302 /2

Page 10 of 11

CLIENT INFORMATION SECTION

Company Name: RW01
Project Manager:
e-mail:
Address:

Phone: Fax:

Sampled by:

ANALYSIS REQUESTED

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time	U.S. EPA M26	U.S.EPA M29	U.S.EPA, M201A										
M26 BLANK					✓												
M29-ALP-T1 (7 SAMPLES)			12/04			✓											
M29-ALP-T2			12/05			✓											
M29-ALP-T3			12/06			✓											
M29-BASELINE-T1			12/07			✓											
M29-BASELINE-T2			12/07			✓											
M29-BASELINE-T3			12/08			✓											
M29-BLANK			N/A			✓											
PM10/2.5-ALP-T1 (4 SAMPLES)			12/04				✓										
PM10/2.5-ALP-T2			12/05				✓										
PM10/2.5-ALP-T3			12/06				✓										
PM10/2.5-BASELINE-T1			12/07				✓										

TAT Requirement

STD 10 Business day ☑
Rush 5 Business day * ☐
Rush 2 Business day * ☐
* need approval from Maxxam

PROJECT INFORMATION

Project #:
Name:
PO #:
Maxxam Quote #:
Maxxam Contact:

REPORTING REQUIREMENTS

Summary Report only ☐
EDD ☐

Regulation

Notes

Please note if this samples are "Industrial Hygiene" samples
If submitting dustfall samples, please indicate the diameter of the jar opening in cm.

PROJECT SPECIFIC COMMENTS

Client Signature:
Affiliation:
Date/Time:

Received by: See Page 1
Affiliation:
Date/Time:

COC-1031 (11/2017)

~~12.0/1~~ FN1 2018/12/11 ~~5.5/5.7/6.2~~ FN1 2018/12/11 ~~5.5/5.7/6.2~~ FN1 2018/12/11 No ice 20.1/20.0/20.1 No ice 19.3/19.9/19.4

Chain of Custody Form - AIR

30744

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B8X0884 (MS/M29/CTM027/M26/M201A)

CAM FCD-01302 /2

Page 10 of 11

ANALYSIS REQUESTED

CLIENT INFORMATION SECTION

Company Name: RWDI
Project Manager:
e-mail:
Address:
Phone: Fax:
Sampled by:

Analysis requested: US EPA M201A

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time	US EPA M201A												
PH1017.5-BASELINE-T2 (4 SAMPLES)		1	12/07		✓												
PH1017.5-BASELINE-T3			12/08		✓												
PH1017.5-BLANK			N/A		✓												

TAT Requirement
STD 10 Business day ☐
Rush 5 Business day * ☐
Rush 2 Business day * ☐
* need approval from Maxxam

PROJECT INFORMATION
Project #:
Name:
PO #:
Maxxam Quote #:
Maxxam Contact:

REPORTING REQUIREMENTS
Summary Report only ☐
EDD ☐
Regulation

Notes
Please note if this samples are "Industrial Hygiene" samples
If submitting dustfall samples, please indicate the diameter of the jar opening in cm.
PROJECT SPECIFIC COMMENTS

Client Signature:
Affiliation:
Date/Time:

Received by: See Page 1
Affiliation:
Date/Time:

COC-1031 (11/2017)

Maxxam
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Your P.O. #: 1804600
Your Project #: 1804600
Site Location: ST. MARYS
Your C.O.C. #: 26188

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/10/24
Report #: R5454999
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8Q5571
Received: 2018/10/09, 08:30

Sample Matrix: Stack Sampling Train
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Mercury 3C in HCl Rinse	3	2018/10/23	2018/10/24	BRL SOP-00104	EPA M29/M0060 m
Mercury 2B in HNO3/H2O2 Imp.	3	2018/10/22	2018/10/24	BRL SOP-00104	EPA M29/M0060 m
Mercury 3A in HNO3 Rinse	3	2018/10/22	2018/10/23	BRL SOP-00104	EPA M29/M0060 m
Mercury 3B in KMnO4/H2SO4 Imp.	3	2018/10/15	2018/10/23	BRL SOP-00104	EPA M29/M0060 m
Mercury 1B in Filter + Rinse (M29)	3	2018/10/16	2018/10/23	BRL SOP-00104	EPA 29 m
Hydrogen Halides -Midget H2SO4 Imp	3	2018/10/15	2018/10/15	BRL SOP-00108	EPA 26 m
Metals in Combined Train (6020B m)	3	2018/10/16	2018/10/18	BRL SOP-00103/ BRL SOP-00102	EPA M29/CARB 436 m
Ammonium in Midget H2SO4 Imp(CTM-027mod)	3	2018/10/12	2018/10/12	BRL SOP-00107	EPA CTM-027 m
>10um Particulates in Rinse	3	2018/10/11	2018/10/19	BRL SOP-00109	EPA M201A
2.5-10um Particulates in Rinse	3	2018/10/11	2018/10/19	BRL SOP-00109	EPA M201A
2.5 um Particulates on Filter	3	N/A	2018/10/11	BRL SOP-00109	EPA M201A
<2.5um Particulates in Rinse	3	2018/10/11	2018/10/19	BRL SOP-00109	EPA M201A
Particulates/Acetone Rinse (M5/315/M201)	3	2018/10/10	2018/10/15	BRL SOP-00109	EPA 5/315 m
Particulates/Filter (M5/315/NJATM1/M201)	3	N/A	2018/10/11	BRL SOP-00109	EPA 5/315/NJATM1 m
Final Volume of Acetone Probe Rinse	3	N/A	2018/10/15	BRL SOP-00109	
Final Volume of Acetone Probe Rinse	3	N/A	2018/10/19	BRL SOP-00109	
Volume of Sulfuric Acid Impinger	3	N/A	2018/10/12		

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their

Your P.O. #: 1804600
Your Project #: 1804600
Site Location: ST. MARYS
Your C.O.C. #: 26188

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/10/24
Report #: R5454999
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8Q5571
Received: 2018/10/09, 08:30
agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769
==
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Maxxam Job #: B8Q5571
Report Date: 2018/10/24

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

RESULTS OF ANALYSES OF STACK SAMPLING TRAIN

Maxxam ID		HYV713	HYV714	HYV715			
Sampling Date		2018/09/30	2018/10/01	2018/10/02			
COC Number		26188	26188	26188			
	UNITS	**M5/29-T1**	**M5/29-T2**	**M5/29-T3**	**RDL**	**MDL**	**QC Batch**
Acetone Rinse Particulate Weight in Acetone Rinse	mg	25.2	10.1	5.6	0.5	0.1	5774932
Front Half Particulate Weight on Filter	mg	1.00	14.9	26.5	0.30	0.060	5778504
Acetone Rinse Volume	ml	63	64	45	1	1	5774936

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		HYV719	HYV720	HYV721			
Sampling Date		2018/09/30	2018/10/01	2018/10/02			
COC Number							
	UNITS	**M201A-T1**	**M201A-T2**	**M201A-T3**	**RDL**	**MDL**	**QC Batch**
> 10 Particulate Weight in Acetone Rinse	mg	3.7	4.0	2.3	0.5	0.1	5777397
< 2.5 Particulate Weight in Acetone Rinse	mg	ND	ND	ND	0.5	0.5	5777393
2.5 - 10 Particulate Weight in Acetone Rinse	mg	1.4	1.4	1.1	0.5	0.5	5777396
< 2.5 Particulate Weight on Filter	mg	ND	ND	0.70	0.30	0.30	5778523
Acetone Rinse Volume (10)	ml	47	44	41	1	N/A	5777398
Acetone Rinse Volume (2.5 - 10)	ml	24	57	44	1	N/A	5777398
Acetone Rinse Volume (2.5)	ml	19	12	31	1	N/A	5777398

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Maxxam ID		HYV992			HYW001			
Sampling Date		2018/09/30			2018/10/01			
COC Number								
	UNITS	**M26(M)/CTM027(M)- T1**	**RDL**	**MDL**	**M26(M)/CTM027(M)- T2**	**RDL**	**MDL**	**QC Batch**
Sulfuric Acid Volume	ml	49	1	1	49	1	1	5780357
Ammonium (NH4)	ug	3200	75	15	3300	38	7.6	5780351
Hydrochloric Acid	ug	1200	30	6.0	500	30	6.0	5783395

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8Q5571
Report Date: 2018/10/24

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

RESULTS OF ANALYSES OF STACK SAMPLING TRAIN

Maxxam ID		HYW002			
Sampling Date		2018/10/02			
COC Number					
	UNITS	**M26(M)/CTM027(M)- T3**	**RDL**	**MDL**	**QC Batch**
Sulfuric Acid Volume	ml	49	1	1	5780357
Ammonium (NH4)	ug	2400	38	7.6	5780351
Hydrochloric Acid	ug	380	30	6.0	5783395

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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MERCURY BY COLD VAPOUR AA (STACK SAMPLING TRAIN)

Maxxam ID		HYV713			HYV714			HYV715			
Sampling Date		2018/09/30			2018/10/01			2018/10/02			
COC Number		26188			26188			26188			
	UNITS	**M5/29-T1**	**RDL**	**MDL**	**M5/29-T2**	**RDL**	**MDL**	**M5/29-T3**	**RDL**	**MDL**	**QC Batch**
1B Mercury (Hg)	ug	0.042	0.015	0.006	0.050	0.015	0.006	0.033	0.015	0.006	5785191
2B Mercury (Hg)	ug	0.86	0.18	0.0072	1.24	0.21	0.0084	1.48	0.21	0.0084	5796437
3A Mercury (Hg)	ug	0.0068	0.0034	0.00041	0.0162	0.0019	0.00023	0.0110	0.0023	0.00028	5796452
3B Mercury (Hg)	ug	0.06	0.02	0.004	2.11	0.02	0.004	2.17	0.02	0.004	5796457
3C Mercury (Hg)	ug	3.02	0.02	0.004	3.16	0.023	0.0046	2.38	0.023	0.0046	5798720

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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ELEMENTS BY ICP/MS (STACK SAMPLING TRAIN)

Maxxam ID		HYV713			HYV714	HYV715			
Sampling Date		2018/09/30			2018/10/01	2018/10/02			
COC Number		26188			26188	26188			
	UNITS	**M5/29-T1**	**RDL**	**MDL**	**M5/29-T2**	**M5/29-T3**	**RDL**	**MDL**	**QC Batch**
Combined Train Aluminum (Al)	ug	875	60	3.0	803	830	150	7.5	5785203
Combined Train Antimony (Sb)	ug	ND	3.0	0.080	ND	ND	7.5	0.20	5785203
Combined Train Arsenic (As)	ug	1.76	0.80	0.080	ND	ND	2.0	0.20	5785203
Combined Train Barium (Ba)	ug	27.3	1.2	0.80	26.3	19.8	3.0	2.0	5785203
Combined Train Beryllium (Be)	ug	ND	0.18	0.040	ND	ND	0.45	0.10	5785203
Combined Train Boron (B)	ug	69	30	2.0	ND	ND	75	5.0	5785203
Combined Train Cadmium (Cd)	ug	0.35	0.18	0.040	0.47	0.48	0.45	0.10	5785203
Combined Train Calcium (Ca)	ug	9870	300	18	8520	10600	750	45	5785203
Combined Train Chromium (Cr)	ug	6.9	3.0	0.10	ND	ND	7.5	0.25	5785203
Combined Train Cobalt (Co)	ug	7.24	0.18	0.020	0.71	ND	0.45	0.050	5785203
Combined Train Copper (Cu)	ug	4.9	1.5	0.20	4.6	4.0	3.8	0.51	5785203
Combined Train Iron (Fe)	ug	645	60	10	519	720	150	25	5785203
Combined Train Lead (Pb)	ug	16.3	0.60	0.040	17.4	15.4	1.5	0.10	5785203
Combined Train Magnesium (Mg)	ug	429	30	1.0	391	424	75	2.5	5785203
Combined Train Manganese (Mn)	ug	27.6	1.2	0.10	24.8	18.4	3.0	0.25	5785203
Combined Train Molybdenum (Mo)	ug	12.4	1.0	0.10	12.2	12.3	2.5	0.25	5785203
Combined Train Nickel (Ni)	ug	8.8	1.0	0.20	6.9	5.7	2.5	0.50	5785203
Combined Train Phosphorus (P)	ug	92	90	10	ND	ND	230	26	5785203
Combined Train Potassium (K)	ug	1520	120	6.0	1460	1450	300	15	5785203
Combined Train Selenium (Se)	ug	ND	2.0	0.50	ND	ND	5.0	1.3	5785203
Combined Train Silver (Ag)	ug	13.3	0.24	0.040	1.02	ND	0.60	0.10	5785203
Combined Train Strontium (Sr)	ug	20.2	0.90	0.060	17.3	20.0	2.3	0.15	5785203
Combined Train Thallium (Tl)	ug	0.50	0.24	0.10	ND	ND	0.60	0.25	5785203
Combined Train Tin (Sn)	ug	114	1.2	0.10	125	108	3.0	0.25	5785203
Combined Train Titanium (Ti)	ug	52.1	3.0	0.30	48.7	51.4	7.5	0.75	5785203
Combined Train Vanadium (V)	ug	1.20	0.60	0.080	ND	ND	1.5	0.20	5785203
Combined Train Zinc (Zn)	ug	53	20	2.0	31	ND	25	2.5	5785203

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B8Q5571
Report Date: 2018/10/24

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

TEST SUMMARY

Maxxam ID: HYV713
Sample ID: M5/29-T1
Matrix: Stack Sampling Train

Collected: 2018/09/30
Shipped:
Received: 2018/10/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 3C in HCl Rinse	CV/AA	5798720	2018/10/23	2018/10/24	Meghaben Patel
Mercury 2B in HNO3/H2O2 Imp.	CV/AA	5796437	2018/10/22	2018/10/24	Meghaben Patel
Mercury 3A in HNO3 Rinse	CV/AA	5796452	2018/10/22	2018/10/23	Meghaben Patel
Mercury 3B in KMnO4/H2SO4 Imp.	CV/AA	5796457	2018/10/15	2018/10/23	Meghaben Patel
Mercury 1B in Filter + Rinse (M29)	CV/AA	5785191	2018/10/16	2018/10/23	Meghaben Patel
Metals in Combined Train (6020B m)	ICP1/MS	5785203	2018/10/16	2018/10/18	Nan Raykha
Particulates/Acetone Rinse (M5/315/M201)	BAL	5774932	2018/10/10	2018/10/15	Farag Farag
Particulates/Filter (M5/315/NJATM1/M201)	BAL	5778504	N/A	2018/10/11	Brenda Moore
Final Volume of Acetone Probe Rinse		5774936	N/A	2018/10/15	Farag Farag

Maxxam ID: HYV713 Dup
Sample ID: M5/29-T1
Matrix: Stack Sampling Train

Collected: 2018/09/30
Shipped:
Received: 2018/10/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 3A in HNO3 Rinse	CV/AA	5796452	2018/10/23	2018/10/23	Meghaben Patel
Mercury 3B in KMnO4/H2SO4 Imp.	CV/AA	5796457	2018/10/22	2018/10/23	Meghaben Patel
Metals in Combined Train (6020B m)	ICP1/MS	5785203	2018/10/17	2018/10/18	Nan Raykha

Maxxam ID: HYV714
Sample ID: M5/29-T2
Matrix: Stack Sampling Train

Collected: 2018/10/01
Shipped:
Received: 2018/10/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 3C in HCl Rinse	CV/AA	5798720	2018/10/23	2018/10/24	Meghaben Patel
Mercury 2B in HNO3/H2O2 Imp.	CV/AA	5796437	2018/10/22	2018/10/24	Meghaben Patel
Mercury 3A in HNO3 Rinse	CV/AA	5796452	2018/10/22	2018/10/23	Meghaben Patel
Mercury 3B in KMnO4/H2SO4 Imp.	CV/AA	5796457	2018/10/15	2018/10/23	Meghaben Patel
Mercury 1B in Filter + Rinse (M29)	CV/AA	5785191	2018/10/16	2018/10/23	Meghaben Patel
Metals in Combined Train (6020B m)	ICP1/MS	5785203	2018/10/16	2018/10/18	Nan Raykha
Particulates/Acetone Rinse (M5/315/M201)	BAL	5774932	2018/10/10	2018/10/15	Farag Farag
Particulates/Filter (M5/315/NJATM1/M201)	BAL	5778504	N/A	2018/10/11	Brenda Moore
Final Volume of Acetone Probe Rinse		5774936	N/A	2018/10/15	Farag Farag

Maxxam ID: HYV714 Dup
Sample ID: M5/29-T2
Matrix: Stack Sampling Train

Collected: 2018/10/01
Shipped:
Received: 2018/10/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 2B in HNO3/H2O2 Imp.	CV/AA	5796437	2018/10/22	2018/10/24	Meghaben Patel

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Maxxam Job #: B8Q5571
Report Date: 2018/10/24

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

TEST SUMMARY

Maxxam ID: HYV715
Sample ID: M5/29-T3
Matrix: Stack Sampling Train

Collected: 2018/10/02
Shipped:
Received: 2018/10/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 3C in HCl Rinse	CV/AA	5798720	2018/10/23	2018/10/24	Meghaben Patel
Mercury 2B in HNO3/H2O2 Imp.	CV/AA	5796437	2018/10/22	2018/10/24	Meghaben Patel
Mercury 3A in HNO3 Rinse	CV/AA	5796452	2018/10/22	2018/10/23	Meghaben Patel
Mercury 3B in KMnO4/H2SO4 Imp.	CV/AA	5796457	2018/10/15	2018/10/23	Meghaben Patel
Mercury 1B in Filter + Rinse (M29)	CV/AA	5785191	2018/10/16	2018/10/23	Meghaben Patel
Metals in Combined Train (6020B m)	ICP1/MS	5785203	2018/10/16	2018/10/18	Nan Raykha
Particulates/Acetone Rinse (M5/315/M201)	BAL	5774932	2018/10/10	2018/10/15	Farag Farag
Particulates/Filter (M5/315/NJATM1/M201)	BAL	5778504	N/A	2018/10/11	Brenda Moore
Final Volume of Acetone Probe Rinse		5774936	N/A	2018/10/15	Farag Farag

Maxxam ID: HYV715 Dup
Sample ID: M5/29-T3
Matrix: Stack Sampling Train

Collected: 2018/10/02
Shipped:
Received: 2018/10/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 3C in HCl Rinse	CV/AA	5798720	2018/10/23	2018/10/24	Meghaben Patel
Mercury 1B in Filter + Rinse (M29)	CV/AA	5785191	2018/10/18	2018/10/23	Meghaben Patel

Maxxam ID: HYV719
Sample ID: M201A-T1
Matrix: Stack Sampling Train

Collected: 2018/09/30
Shipped:
Received: 2018/10/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
>10um Particulates in Rinse	BAL	5777397	2018/10/11	2018/10/19	Farag Farag
2.5-10um Particulates in Rinse	BAL	5777396	2018/10/11	2018/10/19	Farag Farag
2.5 um Particulates on Filter	BAL	5778523	N/A	2018/10/11	Brenda Moore
<2.5um Particulates in Rinse	BAL	5777393	2018/10/11	2018/10/19	Farag Farag
Final Volume of Acetone Probe Rinse		5777398	N/A	2018/10/19	Farag Farag

Maxxam ID: HYV720
Sample ID: M201A-T2
Matrix: Stack Sampling Train

Collected: 2018/10/01
Shipped:
Received: 2018/10/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
>10um Particulates in Rinse	BAL	5777397	2018/10/11	2018/10/19	Farag Farag
2.5-10um Particulates in Rinse	BAL	5777396	2018/10/11	2018/10/19	Farag Farag
2.5 um Particulates on Filter	BAL	5778523	N/A	2018/10/11	Brenda Moore
<2.5um Particulates in Rinse	BAL	5777393	2018/10/11	2018/10/19	Farag Farag
Final Volume of Acetone Probe Rinse		5777398	N/A	2018/10/19	Farag Farag

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Maxxam Job #: B8Q5571
Report Date: 2018/10/24

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

TEST SUMMARY

Maxxam ID: HYV721
Sample ID: M201A-T3
Matrix: Stack Sampling Train

Collected: 2018/10/02
Shipped:
Received: 2018/10/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
>10um Particulates in Rinse	BAL	5777397	2018/10/11	2018/10/19	Farag Farag
2.5-10um Particulates in Rinse	BAL	5777396	2018/10/11	2018/10/19	Farag Farag
2.5 um Particulates on Filter	BAL	5778523	N/A	2018/10/11	Brenda Moore
<2.5um Particulates in Rinse	BAL	5777393	2018/10/11	2018/10/19	Farag Farag
Final Volume of Acetone Probe Rinse		5777398	N/A	2018/10/19	Farag Farag

Maxxam ID: HYV992
Sample ID: M26(M)/CTM027(M)- T1
Matrix: Stack Sampling Train

Collected: 2018/09/30
Shipped:
Received: 2018/10/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Halides -Midget H2SO4 Imp	IC/SPEC	5783395	2018/10/15	2018/10/15	Ann-Marie Stern
Ammonium in Midget H2SO4 Imp(CTM-027mod)	IC/SPEC	5780351	2018/10/12	2018/10/12	Rupinder Sihota
Volume of Sulfuric Acid Impinger		5780357	N/A	2018/10/12	Walt Wang

Maxxam ID: HYV992 Dup
Sample ID: M26(M)/CTM027(M)- T1
Matrix: Stack Sampling Train

Collected: 2018/09/30
Shipped:
Received: 2018/10/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Halides -Midget H2SO4 Imp	IC/SPEC	5783395	2018/10/15	2018/10/15	Ann-Marie Stern
Ammonium in Midget H2SO4 Imp(CTM-027mod)	IC/SPEC	5780351	2018/10/12	2018/10/12	Rupinder Sihota

Maxxam ID: HYW001
Sample ID: M26(M)/CTM027(M)- T2
Matrix: Stack Sampling Train

Collected: 2018/10/01
Shipped:
Received: 2018/10/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Halides -Midget H2SO4 Imp	IC/SPEC	5783395	2018/10/15	2018/10/15	Ann-Marie Stern
Ammonium in Midget H2SO4 Imp(CTM-027mod)	IC/SPEC	5780351	2018/10/12	2018/10/12	Rupinder Sihota
Volume of Sulfuric Acid Impinger		5780357	N/A	2018/10/12	Walt Wang

Maxxam ID: HYW002
Sample ID: M26(M)/CTM027(M)- T3
Matrix: Stack Sampling Train

Collected: 2018/10/02
Shipped:
Received: 2018/10/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Halides -Midget H2SO4 Imp	IC/SPEC	5783395	2018/10/15	2018/10/15	Ann-Marie Stern
Ammonium in Midget H2SO4 Imp(CTM-027mod)	IC/SPEC	5780351	2018/10/12	2018/10/12	Rupinder Sihota
Volume of Sulfuric Acid Impinger		5780357	N/A	2018/10/12	Walt Wang

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GENERAL COMMENTS

ELEMENTS BY ICP/MS (STACK SAMPLING TRAIN)

Metals in Combined Train (6020B m): Extra dilution was required for samples HYV714 and HYV715 due to the matrix.
Post digestion duplicate and spike were done on sample HYV713.
Trace level Ba (1.4 ug) was observed in the Processed Blank.

Results relate only to the items tested.

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Maxxam Job #: B8Q5571
Report Date: 2018/10/24

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5774932	FF	Method Blank	Acetone Rinse Particulate Weight in Acetone Rinse	2018/10/15	ND, RDL=0.5		mg	
5777393	FF	Method Blank	< 2.5 Particulate Weight in Acetone Rinse	2018/10/19	ND, RDL=0.5		mg	
5777396	FF	Method Blank	2.5 - 10 Particulate Weight in Acetone Rinse	2018/10/19	ND, RDL=0.5		mg	
5777397	FF	Method Blank	> 10 Particulate Weight in Acetone Rinse	2018/10/19	ND, RDL=0.5		mg	
5780351	RSU	Matrix Spike(HYV992)	Ammonium (NH4)	2018/10/12		96	%	75 - 125
5780351	RSU	Spiked Blank	Ammonium (NH4)	2018/10/12		100	%	90 - 110
5780351	RSU	Method Blank	Ammonium (NH4)	2018/10/12	ND, RDL=3.8		ug	
5780351	RSU	RPD - Sample/Sample Dup	Ammonium (NH4)	2018/10/12	0.65		%	20
5783395	A_S	Matrix Spike(HYV992)	Hydrochloric Acid	2018/10/15		89	%	80 - 120
5783395	A_S	Spiked Blank	Hydrochloric Acid	2018/10/15		100	%	90 - 110
5783395	A_S	Method Blank	Hydrochloric Acid	2018/10/15	ND, RDL=30		ug	
5783395	A_S	RPD - Sample/Sample Dup	Hydrochloric Acid	2018/10/15	0.59		%	20
5785191	MPD	Reagent Blank	1B Mercury (Hg)	2018/10/23	ND, RDL=0.015		ug	
5785191	MPD	Matrix Spike(HYV715)	1B Mercury (Hg)	2018/10/23		103	%	85 - 115
5785191	MPD	MS/MSD RPD	1B Mercury (Hg)	2018/10/23	0.88		%	20
5785191	MPD	Spiked Blank	1B Mercury (Hg)	2018/10/23		99	%	90 - 110
5785191	MPD	RPD	1B Mercury (Hg)	2018/10/23	4.3		%	20
5785191	MPD	Method Blank	1B Mercury (Hg)	2018/10/23	ND, RDL=0.015		ug	
5785191	MPD	RPD - Sample/Sample Dup	1B Mercury (Hg)	2018/10/23	0.92		%	20
5785203	N_R	Matrix Spike(HYV713)	Combined Train Aluminum (Al)	2018/10/18		91	%	75 - 125
			Combined Train Antimony (Sb)	2018/10/18		103	%	75 - 125
			Combined Train Arsenic (As)	2018/10/18		96	%	75 - 125
			Combined Train Barium (Ba)	2018/10/18		98	%	75 - 125
			Combined Train Beryllium (Be)	2018/10/18		99	%	75 - 125
			Combined Train Boron (B)	2018/10/18		94	%	75 - 125
			Combined Train Cadmium (Cd)	2018/10/18		100	%	75 - 125
			Combined Train Calcium (Ca)	2018/10/18		94	%	75 - 125
			Combined Train Chromium (Cr)	2018/10/18		96	%	75 - 125
			Combined Train Cobalt (Co)	2018/10/18		98	%	75 - 125
			Combined Train Copper (Cu)	2018/10/18		99	%	75 - 125
			Combined Train Iron (Fe)	2018/10/18		98	%	75 - 125
			Combined Train Lead (Pb)	2018/10/18		101	%	75 - 125
			Combined Train Magnesium (Mg)	2018/10/18		100	%	75 - 125
			Combined Train Manganese (Mn)	2018/10/18		97	%	75 - 125
			Combined Train Molybdenum (Mo)	2018/10/18		103	%	75 - 125
			Combined Train Nickel (Ni)	2018/10/18		99	%	75 - 125
			Combined Train Phosphorus (P)	2018/10/18		98	%	75 - 125
			Combined Train Potassium (K)	2018/10/18		97	%	75 - 125
			Combined Train Selenium (Se)	2018/10/18		95	%	75 - 125
			Combined Train Silver (Ag)	2018/10/18		101	%	75 - 125
			Combined Train Strontium (Sr)	2018/10/18		98	%	75 - 125
			Combined Train Thallium (Tl)	2018/10/18		101	%	75 - 125
			Combined Train Tin (Sn)	2018/10/18		100	%	75 - 125
			Combined Train Titanium (Ti)	2018/10/18		98	%	75 - 125

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Maxxam Job #: B8Q5571
Report Date: 2018/10/24

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Combined Train Vanadium (V)	2018/10/18		98	%	75 - 125
			Combined Train Zinc (Zn)	2018/10/18		96	%	75 - 125
5785203	N_R	MS/MSD RPD	Combined Train Aluminum (Al)	2018/10/18	6.6		%	20
			Combined Train Antimony (Sb)	2018/10/18	0.63		%	20
			Combined Train Arsenic (As)	2018/10/18	0.021		%	20
			Combined Train Barium (Ba)	2018/10/18	0.051		%	20
			Combined Train Beryllium (Be)	2018/10/18	0.79		%	20
			Combined Train Boron (B)	2018/10/18	1.7		%	20
			Combined Train Cadmium (Cd)	2018/10/18	2.0		%	20
			Combined Train Calcium (Ca)	2018/10/18	0		%	20
			Combined Train Chromium (Cr)	2018/10/18	1.4		%	20
			Combined Train Cobalt (Co)	2018/10/18	1.2		%	20
			Combined Train Copper (Cu)	2018/10/18	0.96		%	20
			Combined Train Iron (Fe)	2018/10/18	2.1		%	20
			Combined Train Lead (Pb)	2018/10/18	0.82		%	20
			Combined Train Magnesium (Mg)	2018/10/18	0.77		%	20
			Combined Train Manganese (Mn)	2018/10/18	2.5		%	20
			Combined Train Molybdenum (Mo)	2018/10/18	0.84		%	20
			Combined Train Nickel (Ni)	2018/10/18	1.3		%	20
			Combined Train Phosphorus (P)	2018/10/18	0.14		%	20
			Combined Train Potassium (K)	2018/10/18	0		%	20
			Combined Train Selenium (Se)	2018/10/18	2.1		%	20
			Combined Train Silver (Ag)	2018/10/18	0.90		%	20
			Combined Train Strontium (Sr)	2018/10/18	1.5		%	20
			Combined Train Thallium (Tl)	2018/10/18	0.37		%	20
			Combined Train Tin (Sn)	2018/10/18	4.2		%	20
			Combined Train Titanium (Ti)	2018/10/18	3.1		%	20
			Combined Train Vanadium (V)	2018/10/18	0.65		%	20
			Combined Train Zinc (Zn)	2018/10/18	0.94		%	20
5785203	N_R	Spiked Blank	Combined Train Aluminum (Al)	2018/10/18		107	%	85 - 115
			Combined Train Antimony (Sb)	2018/10/18		105	%	85 - 115
			Combined Train Arsenic (As)	2018/10/18		100	%	85 - 115
			Combined Train Barium (Ba)	2018/10/18		100	%	85 - 115
			Combined Train Beryllium (Be)	2018/10/18		102	%	85 - 115
			Combined Train Boron (B)	2018/10/18		111	%	85 - 115
			Combined Train Cadmium (Cd)	2018/10/18		104	%	85 - 115
			Combined Train Calcium (Ca)	2018/10/18		100	%	85 - 115
			Combined Train Chromium (Cr)	2018/10/18		101	%	85 - 115
			Combined Train Cobalt (Co)	2018/10/18		101	%	85 - 115
			Combined Train Copper (Cu)	2018/10/18		105	%	85 - 115
			Combined Train Iron (Fe)	2018/10/18		105	%	85 - 115
			Combined Train Lead (Pb)	2018/10/18		102	%	85 - 115
			Combined Train Magnesium (Mg)	2018/10/18		103	%	85 - 115
			Combined Train Manganese (Mn)	2018/10/18		101	%	85 - 115
			Combined Train Molybdenum (Mo)	2018/10/18		108	%	85 - 115
			Combined Train Nickel (Ni)	2018/10/18		101	%	85 - 115
			Combined Train Phosphorus (P)	2018/10/18		113	%	85 - 115
			Combined Train Potassium (K)	2018/10/18		103	%	85 - 115
			Combined Train Selenium (Se)	2018/10/18		101	%	85 - 115
			Combined Train Silver (Ag)	2018/10/18		105	%	85 - 115
			Combined Train Strontium (Sr)	2018/10/18		102	%	85 - 115
			Combined Train Thallium (Tl)	2018/10/18		103	%	85 - 115

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Maxxam Job #: B8Q5571
Report Date: 2018/10/24

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Combined Train Tin (Sn)	2018/10/18		106	%	85 - 115
			Combined Train Titanium (Ti)	2018/10/18		103	%	85 - 115
			Combined Train Vanadium (V)	2018/10/18		102	%	85 - 115
			Combined Train Zinc (Zn)	2018/10/18		100	%	85 - 115
5785203	N_R	RPD	Combined Train Aluminum (Al)	2018/10/18	0.29		%	20
			Combined Train Antimony (Sb)	2018/10/18	0.60		%	20
			Combined Train Arsenic (As)	2018/10/18	0.090		%	20
			Combined Train Barium (Ba)	2018/10/18	1.4		%	20
			Combined Train Beryllium (Be)	2018/10/18	0.51		%	20
			Combined Train Boron (B)	2018/10/18	5.5		%	20
			Combined Train Cadmium (Cd)	2018/10/18	0.94		%	20
			Combined Train Calcium (Ca)	2018/10/18	0		%	20
			Combined Train Chromium (Cr)	2018/10/18	0.14		%	20
			Combined Train Cobalt (Co)	2018/10/18	1.1		%	20
			Combined Train Copper (Cu)	2018/10/18	1.3		%	20
			Combined Train Iron (Fe)	2018/10/18	0.77		%	20
			Combined Train Lead (Pb)	2018/10/18	1.8		%	20
			Combined Train Magnesium (Mg)	2018/10/18	1.0		%	20
			Combined Train Manganese (Mn)	2018/10/18	0.46		%	20
			Combined Train Molybdenum (Mo)	2018/10/18	1.7		%	20
			Combined Train Nickel (Ni)	2018/10/18	0.38		%	20
			Combined Train Phosphorus (P)	2018/10/18	0.74		%	20
			Combined Train Potassium (K)	2018/10/18	0		%	20
			Combined Train Selenium (Se)	2018/10/18	1.8		%	20
			Combined Train Silver (Ag)	2018/10/18	0.71		%	20
			Combined Train Strontium (Sr)	2018/10/18	1.1		%	20
			Combined Train Thallium (Tl)	2018/10/18	2.9		%	20
			Combined Train Tin (Sn)	2018/10/18	1.1		%	20
			Combined Train Titanium (Ti)	2018/10/18	0.35		%	20
			Combined Train Vanadium (V)	2018/10/18	0.80		%	20
			Combined Train Zinc (Zn)	2018/10/18	0.86		%	20
5785203	N_R	Method Blank	Combined Train Aluminum (Al)	2018/10/18	ND, RDL=60		ug	
			Combined Train Antimony (Sb)	2018/10/18	ND, RDL=3.0		ug	
			Combined Train Arsenic (As)	2018/10/18	ND, RDL=0.80		ug	
			Combined Train Barium (Ba)	2018/10/18	1.4, RDL=1.2		ug	
			Combined Train Beryllium (Be)	2018/10/18	ND, RDL=0.18		ug	
			Combined Train Boron (B)	2018/10/18	ND, RDL=30		ug	
			Combined Train Cadmium (Cd)	2018/10/18	ND, RDL=0.18		ug	
			Combined Train Calcium (Ca)	2018/10/18	ND, RDL=300		ug	
			Combined Train Chromium (Cr)	2018/10/18	ND, RDL=3.0		ug	
			Combined Train Cobalt (Co)	2018/10/18	ND, RDL=0.18		ug	

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Maxxam Job #: B8Q5571
Report Date: 2018/10/24

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Combined Train Copper (Cu)	2018/10/18	ND, RDL=1.5		ug	
			Combined Train Iron (Fe)	2018/10/18	ND, RDL=60		ug	
			Combined Train Lead (Pb)	2018/10/18	ND, RDL=0.60		ug	
			Combined Train Magnesium (Mg)	2018/10/18	ND, RDL=30		ug	
			Combined Train Manganese (Mn)	2018/10/18	ND, RDL=1.2		ug	
			Combined Train Molybdenum (Mo)	2018/10/18	ND, RDL=1.0		ug	
			Combined Train Nickel (Ni)	2018/10/18	ND, RDL=1.0		ug	
			Combined Train Phosphorus (P)	2018/10/18	ND, RDL=90		ug	
			Combined Train Potassium (K)	2018/10/18	ND, RDL=120		ug	
			Combined Train Selenium (Se)	2018/10/18	ND, RDL=2.0		ug	
			Combined Train Silver (Ag)	2018/10/18	ND, RDL=0.24		ug	
			Combined Train Strontium (Sr)	2018/10/18	ND, RDL=0.90		ug	
			Combined Train Thallium (Tl)	2018/10/18	ND, RDL=0.24		ug	
			Combined Train Tin (Sn)	2018/10/18	ND, RDL=1.2		ug	
			Combined Train Titanium (Ti)	2018/10/18	ND, RDL=3.0		ug	
			Combined Train Vanadium (V)	2018/10/18	ND, RDL=0.60		ug	
			Combined Train Zinc (Zn)	2018/10/18	ND, RDL=10		ug	
5785203	N_R	RPD - Sample/Sample Dup	Combined Train Aluminum (Al)	2018/10/18	1.2		%	20
			Combined Train Antimony (Sb)	2018/10/18	NC		%	20
			Combined Train Arsenic (As)	2018/10/18	0.068		%	20
			Combined Train Barium (Ba)	2018/10/18	1.7		%	20
			Combined Train Beryllium (Be)	2018/10/18	NC		%	20
			Combined Train Boron (B)	2018/10/18	0.70		%	20
			Combined Train Cadmium (Cd)	2018/10/18	0.61		%	20
			Combined Train Calcium (Ca)	2018/10/18	1.1		%	20
			Combined Train Chromium (Cr)	2018/10/18	3.1		%	20
			Combined Train Cobalt (Co)	2018/10/18	1.1		%	20
			Combined Train Copper (Cu)	2018/10/18	1.2		%	20
			Combined Train Iron (Fe)	2018/10/18	0.62		%	20
			Combined Train Lead (Pb)	2018/10/18	0.53		%	20
			Combined Train Magnesium (Mg)	2018/10/18	1.3		%	20
			Combined Train Manganese (Mn)	2018/10/18	1.7		%	20
			Combined Train Molybdenum (Mo)	2018/10/18	1.2		%	20
			Combined Train Nickel (Ni)	2018/10/18	3.1		%	20
			Combined Train Phosphorus (P)	2018/10/18	1.5		%	20

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Maxxam Job #: B8Q5571
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RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Combined Train Potassium (K)	2018/10/18	1.8		%	20
			Combined Train Selenium (Se)	2018/10/18	NC		%	20
			Combined Train Silver (Ag)	2018/10/18	0.53		%	20
			Combined Train Strontium (Sr)	2018/10/18	0.47		%	20
			Combined Train Thallium (Tl)	2018/10/18	4.2		%	20
			Combined Train Tin (Sn)	2018/10/18	1.3		%	20
			Combined Train Titanium (Ti)	2018/10/18	0.0092		%	20
			Combined Train Vanadium (V)	2018/10/18	7.6		%	20
			Combined Train Zinc (Zn)	2018/10/18	1.2		%	20
5796437	MPD	Matrix Spike(HYV714)	2B Mercury (Hg)	2018/10/24		99	%	85 - 115
5796437	MPD	MS/MSD RPD	2B Mercury (Hg)	2018/10/24	1.1		%	20
5796437	MPD	Spiked Blank	2B Mercury (Hg)	2018/10/24		102	%	90 - 110
5796437	MPD	RPD	2B Mercury (Hg)	2018/10/24	1.4		%	20
5796437	MPD	Method Blank	2B Mercury (Hg)	2018/10/24	ND, RDL=0.015		ug	
5796437	MPD	RPD - Sample/Sample Dup	2B Mercury (Hg)	2018/10/24	0.34		%	20
5796452	MPD	Matrix Spike(HYV713)	3A Mercury (Hg)	2018/10/23		90	%	85 - 115
5796452	MPD	Spiked Blank	3A Mercury (Hg)	2018/10/23		99	%	90 - 110
5796452	MPD	RPD	3A Mercury (Hg)	2018/10/23	0.60		%	20
5796452	MPD	Method Blank	3A Mercury (Hg)	2018/10/23	ND, RDL=0.005		ug	
5796452	MPD	RPD - Sample/Sample Dup	3A Mercury (Hg)	2018/10/23	16		%	20
5796457	MPD	Reagent Blank	3B Mercury (Hg)	2018/10/23	ND, RDL=0.013		ug	
5796457	MPD	Matrix Spike(HYV713)	3B Mercury (Hg)	2018/10/23		100	%	85 - 115
5796457	MPD	MS/MSD RPD	3B Mercury (Hg)	2018/10/23	3.1		%	20
5796457	MPD	Spiked Blank	3B Mercury (Hg)	2018/10/23		100	%	90 - 110
5796457	MPD	RPD	3B Mercury (Hg)	2018/10/23	1.2		%	20
5796457	MPD	Method Blank	3B Mercury (Hg)	2018/10/23	ND, RDL=0.013		ug	
5796457	MPD	RPD - Sample/Sample Dup	3B Mercury (Hg)	2018/10/23	0.70		%	20
5798720	MPD	Reagent Blank	3C Mercury (Hg)	2018/10/24	ND, RDL=0.013		ug	
5798720	MPD	Matrix Spike(HYV715)	3C Mercury (Hg)	2018/10/24		87	%	85 - 115
5798720	MPD	MS/MSD RPD	3C Mercury (Hg)	2018/10/24	11 (1)		%	20
5798720	MPD	Spiked Blank	3C Mercury (Hg)	2018/10/24		99	%	90 - 110
5798720	MPD	RPD	3C Mercury (Hg)	2018/10/24	1.5		%	20
5798720	MPD	Method Blank	3C Mercury (Hg)	2018/10/24	ND, RDL=0.013		ug	
5798720	MPD	RPD - Sample/Sample Dup	3C Mercury (Hg)	2018/10/24	0.021		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Reagent Blank: A blank matrix containing all reagents used in the analytical procedure. Used to determine any analytical contamination.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) One of the matrix spikes, is within acceptable limits, hence the data is reported.

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Frank Mo, B.Sc., Inorganic Lab. Manager

John Bowman, Analyst I

Walt Wang, Supervisor, Inorganics

Chain of Custody Form - Source

B8Q5571 (MS/M29/M26(M)/CTM027/M201A)
B8Q5238 (VOST)

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CAM FCD-01303 /2 Page ____ of ____

ANALYSIS REQUESTED

CLIENT INFORMATION SECTION

Company Name: RWDI
Project Manager: Kirk Easto
e-mail: kirk.easto@rwdi.com
Address: Guelph, ON
Phone: 519-823-1311 Fax: 519-823-1316
Sampled by: Kirk Easto

MAXXAM use only	Field Sample ID	# Bottles	Collection Date	Collection Time	Initial Impinger Charge Volumes (mL)*	SVOC ENV/CAN 1/RM/2	US EPA M29	US EPA M26 HCl/NH3	Method 30 VOC's	US EPA M201A						
	T1-Baseline -SVOC (6 pieces)	6	Sept 30			x										
	T2-Baseline -SVOC (6 pieces)	6	Oct 1			x										
	T3-Baseline -SVOC (6 pieces)	6	Oct 2			x										
	T1-Baseline - M29 (7 pieces)	7	Sept 30				x									
	T2-Baseline - M29 (7 pieces)	7	Oct 1				x									
	T3-Baseline - M29 (7 pieces)	7	Oct 2				x									
	T1/T2/T3-Baseline -M26 (3 bottle)	3	09/30-10/032		2 * 15 ml			x								
	T1/T2/T3-Baseline -VOST (3 pairs)	3	09/30-10/032						x							
	T1-Baseline - PM10 (4pieces)	4	Sept 30							x						
	T2-Baseline - PM10 (4pieces)	4	Oct 1							x						
	T3-Baseline - PM10 (4pieces)	4	Oct 2							x						

TAT Requirement
STD 10 Business day ☑
Rush 5 Business day ☐
Rush 2 Business day ☐
Rush 1 Business day ☐
Other (specify):

PROJECT INFORMATION
Project #: 1804600
Name: St. Marys
PO #: 1804600
Maxxam Quote #:
Maxxam Contact: Clayton Johnson

REPORTING REQUIREMENTS
SSAS Audit samples ☐
Summary Report only ☐
Summary Report & ☐
Raw Data Package **
** additional cost may apply

PROJECT SPECIFIC COMMENTS
See attached list for parameter lists
* Initial Impinger charge volumes are required before the following analysis can be started: Method 26, CTM-027 & Method 8

Client Signature: [signature]
Affiliation:
Date/Time: Oct 6 2018

Received by: FIDELE NTAMWEMEZI
Affiliation: [signature]
Date/Time: 2018/10/06 10:30

Method 23 / TO9A
2005 WHO ☐
1989 NATO TEF ☐
1998 WHO ☐
TEF x DL ☐
TEF x 0 DL ☐
TEF x 0.5 DL ☐

8.5/8.9/9.0
20.6/20.4/20.3

SCHEDULE "B2"

TEST CONTAMINANTS

Source Testing Program

B8Q5571 (MS/M29/M26(M)/CTM027/M201A)
B8Q5238 (VOST)

Nitrogen Oxides
Sulphur Dioxide
Carbon Monoxide
Carbon Dioxide
Total Suspended Particulate Matter
PM 10
PM 2.5
Hydrogen Chloride
Ammonia
Calcium Oxide
Ferric Oxide

Metals		Volatile Organic Matter
Cd	Cadmium	acetone
Be	Beryllium	benzene
Pb	Lead	bromodichloromethane
Mo	Molybdenum	bromoform
Cr	Chromium	bromomethane
Ni	Nickel	butanone, 2 -
V	Vanadium	carbon tetrachloride
Al	Aluminum	chlorobenzene
Ti	Titanium	chloroethane
Mg	Magnesium	chloroform
B	Boron	chloromethane
Ba	Barium	cumene (isopropyl benzene)
P	Phosphorus	dibromochloromethane
K	Potassium	dichloroethane, 1,1 -
Hg	Mercury	dichloroethane, 1,2 -
As	Arsenic	dichloroethene, trans - 1,2 -
Zn	Zinc	dichloroethene, 1,1 – (vinyl chloride)
Sb	Antimony	dichloroethylene, cis - 1,2 -
Mn	Manganese	dichloropropane, 1,2 -
Co	Cobalt	ethylbenzene
Se	Selenium	ethylene dibromide (1,2-dibromoethane)
Cu	Copper	methylene chloride
Ag	Silver	styrene
Sn	Tin	tetrachloroethane, 1,1,1,2 -
Sr	Strontium	tetrachloroethane, 1,1,2,2 -
Tl	Thalium	tetrachloroethene
		toluene
		trichloroethane, 1,1,1 –
		trichloroethane, 1,1,2 -
		trichloroethene (trichloroethylene, 1,1,2 -)
		xylenes

FIDELE NTAMWEMEZI 2018/10/06
Fidele Ntamwemezi 10:30

8.5/8.9/9.0
20.6/20.4/20.3
~~23/23/22~~ FN1 2018/10/09

B8Q5571

RWDI	B8O3742	Pall			18072358	0.45390
	HUA110-01	90mm Quartz			18072359	0.45930
		p/n 7203			18072360	0.45990
		lot# 20531			18072361	0.45810
					18072362	0.45565
					18072363	0.45625
					18072364	0.45800
					18072365	0.45790
					18072366	0.46280
					18072367	0.46005
					18072368	0.46365
					18072369	0.46005
					18072370	0.45730
					18072371	0.45940
					18072372	0.45655

RWDI	B8O3742	Pall			18081617	0.45850
	HUA110-01	90mm Quartx			18081618	0.45860
		p/n 7203			18081619	0.46085
		lot# 20531			18081620	0.45840
					18081621	0.45955

R. Patel, Rain Patel 2018/10/09 08:30

23/23/22

~~20. 20.6/20.4/20.3~~

FNL 2018/10/09

B8Q5571

For Clayton Johnson dropped of samples Saturday for RWD1 These were not included

FIDELE NTAMWEMEZI 2018/10/09
Fidele Ntamwemezi 08:30

23/23/22

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Your P.O. #: 1804600
Your Project #: 1804600
Site Location: ST. MARYS
Your C.O.C. #: 26188

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/11/01
Report #: R5466884
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8R2682
Received: 2018/10/16, 11:43

Sample Matrix: Stack Sampling Train
Samples Received: 12

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Mercury 3C in HCl Rinse	4	2018/10/30	2018/11/01	BRL SOP-00104	EPA M29/M0060 m
Mercury 2B in HNO3/H2O2 Imp.	4	2018/10/29	2018/10/30	BRL SOP-00104	EPA M29/M0060 m
Mercury 3A in HNO3 Rinse	4	2018/10/29	2018/10/30	BRL SOP-00104	EPA M29/M0060 m
Mercury 3B in KMnO4/H2SO4 Imp.	1	2018/10/29	2018/10/31	BRL SOP-00104	EPA M29/M0060 m
Mercury 3B in KMnO4/H2SO4 Imp.	3	2018/10/30	2018/10/31	BRL SOP-00104	EPA M29/M0060 m
Mercury 1B in Filter + Rinse (M29)	4	2018/10/23	2018/10/30	BRL SOP-00104	EPA 29 m
Hydrogen Halides -Midget H2SO4 Imp	4	2018/10/22	2018/10/22	BRL SOP-00108	EPA 26 m
Metals in Combined Train (6020B m)	4	2018/10/23	2018/10/25	BRL SOP-00103/ BRL SOP-00102	EPA M29/CARB 436 m
Ammonium in Midget H2SO4 Imp(CTM-027mod)	4	2018/10/18	2018/10/18	BRL SOP-00107	EPA CTM-027 m
>10um Particulates in Rinse	3	2018/10/18	2018/10/25	BRL SOP-00109	EPA M201A
2.5-10um Particulates in Rinse	3	2018/10/18	2018/10/25	BRL SOP-00109	EPA M201A
2.5 um Particulates on Filter	4	N/A	2018/10/17	BRL SOP-00109	EPA M201A
<2.5um Particulates in Rinse	3	2018/10/18	2018/10/25	BRL SOP-00109	EPA M201A
Particulates/Acetone Rinse (M5/315/M201)	4	2018/10/18	2018/10/23	BRL SOP-00109	EPA 5/315 m
Particulates/Filter (M5/315/NJATM1/M201)	4	N/A	2018/10/17	BRL SOP-00109	EPA 5/315/NJATM1 m
Final Volume of Acetone Probe Rinse	4	N/A	2018/10/23	BRL SOP-00109	
Final Volume of Acetone Probe Rinse	3	N/A	2018/10/25	BRL SOP-00109	
Volume of Sulfuric Acid Impinger	4	N/A	2018/10/18		

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report.

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Your P.O. #: 1804600
Your Project #: 1804600
Site Location: ST. MARYS
Your C.O.C. #: 26188

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/11/01
Report #: R5466884
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8R2682
Received: 2018/10/16, 11:43

Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769
==
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Maxxam Job #: B8R2682
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

RESULTS OF ANALYSES OF STACK SAMPLING TRAIN

Maxxam ID		IAK787	IAK788	IAK789	IAK808			
Sampling Date			2018/10/10	2018/10/12	2018/10/12			
COC Number		26188	26188	26188	26188			
	UNITS	**M5/29 - BLANK**	**M5/29- T1**	**M5/29- T2**	**M5/29- T3**	**RDL**	**MDL**	**QC Batch**
Acetone Rinse Particulate Weight in Acetone Rinse	mg	0.5	6.3	11.9	6.3	0.5	0.1	5790014
Front Half Particulate Weight on Filter	mg	1.80	9.50	9.60	10.1	0.30	0.060	5788665
Acetone Rinse Volume	ml	48	81	74	79	1	1	5790015

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		IAK811				IAK812	IAK813			
Sampling Date						2018/10/10	2018/10/12			
COC Number										
	UNITS	**M201A- BLANK**	**RDL**	**MDL**	**QC Batch**	**M201A- T1**	**M201A- T2**	**RDL**	**MDL**	**QC Batch**
> 10 Particulate Weight in Acetone Rinse	mg					8.7	5.9	0.5	0.1	5790349
< 2.5 Particulate Weight in Acetone Rinse	mg					ND	ND	0.5	0.5	5790345
2.5 - 10 Particulate Weight in Acetone Rinse	mg					1.7	1.2	0.5	0.5	5790347
< 2.5 Particulate Weight on Filter	mg	ND	0.30	0.30	5788827	0.40	0.60	0.30	0.30	5788827
Acetone Rinse Volume (10)	ml					27	26	1	N/A	5790350
Acetone Rinse Volume (2.5 - 10)	ml					38	41	1	N/A	5790350
Acetone Rinse Volume (2.5)	ml					13	10	1	N/A	5790350

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

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Maxxam Job #: B8R2682
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

RESULTS OF ANALYSES OF STACK SAMPLING TRAIN

Maxxam ID		IAK814				IAK815			
Sampling Date		2018/10/12							
COC Number									
	UNITS	**M201A- T3**	**RDL**	**MDL**	**QC Batch**	**M26(M)/CTM027(M)-BLANK**	**RDL**	**MDL**	**QC Batch**
> 10 Particulate Weight in Acetone Rinse	mg	7.8	0.5	0.1	5790349				
< 2.5 Particulate Weight in Acetone Rinse	mg	ND	0.5	0.5	5790345				
2.5 - 10 Particulate Weight in Acetone Rinse	mg	2.0	0.5	0.5	5790347				
< 2.5 Particulate Weight on Filter	mg	0.90	0.30	0.30	5788827				
Sulfuric Acid Volume	ml					49	1	1	5789747
Acetone Rinse Volume (10)	ml	60	1	N/A	5790350				
Acetone Rinse Volume (2.5 - 10)	ml	55	1	N/A	5790350				
Acetone Rinse Volume (2.5)	ml	12	1	N/A	5790350				
Ammonium (NH4)	ug					5.8	3.8	0.76	5789745
Hydrochloric Acid	ug					250	30	6.0	5796430

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Maxxam ID		IAK816	IAK817			
Sampling Date		2018/10/10	2018/10/12			
COC Number						
	UNITS	**M26(M)/CTM027(M)- T1**	**M26(M)/CTM027(M)- T2**	**RDL**	**MDL**	**QC Batch**
Sulfuric Acid Volume	ml	47	47	1	1	5789747
Ammonium (NH4)	ug	2100	1900	38	7.6	5789745
Hydrochloric Acid	ug	470	440	30	6.0	5796430

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		IAK818			
Sampling Date		2018/10/12			
COC Number					
	UNITS	**M26(M)/CTM027(M)- T3**	**RDL**	**MDL**	**QC Batch**
Sulfuric Acid Volume	ml	50	1	1	5789747
Ammonium (NH4)	ug	1900	38	7.6	5789745
Hydrochloric Acid	ug	390	30	6.0	5796430

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8R2682
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

MERCURY BY COLD VAPOUR AA (STACK SAMPLING TRAIN)

Maxxam ID		IAK787			IAK788			IAK789			
Sampling Date					2018/10/10			2018/10/12			
COC Number		26188			26188			26188			
	UNITS	**M5/29 - BLANK**	**RDL**	**MDL**	**M5/29- T1**	**RDL**	**MDL**	**M5/29- T2**	**RDL**	**MDL**	**QC Batch**
1B Mercury (Hg)	ug	ND	0.015	0.006	0.045	0.015	0.006	0.021	0.015	0.006	5798624
2B Mercury (Hg)	ug	ND	0.15	0.006	1.70	0.23	0.0092	1.03	0.23	0.0092	5807891
3A Mercury (Hg)	ug	ND	0.0015	0.00018	0.0145	0.0032	0.00038	0.0032	0.0031	0.00037	5807885
3B Mercury (Hg)	ug	ND	0.02	0.004	0.442	0.023	0.0046	0.33	0.02	0.004	5809990
3C Mercury (Hg)	ug	ND	0.013	0.0026	0.803	0.023	0.0046	2.14	0.023	0.0046	5811004

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Maxxam ID		IAK808			
Sampling Date		2018/10/12			
COC Number		26188			
	UNITS	**M5/29- T3**	**RDL**	**MDL**	**QC Batch**
1B Mercury (Hg)	ug	0.038	0.015	0.006	5798624
2B Mercury (Hg)	ug	1.27	0.23	0.0092	5807891
3A Mercury (Hg)	ug	ND	0.0043	0.00052	5807885
3B Mercury (Hg)	ug	2.16	0.018	0.0036	5809990
3C Mercury (Hg)	ug	0.159	0.018	0.0036	5811004

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B8R2682
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

ELEMENTS BY ICP/MS (STACK SAMPLING TRAIN)

Maxxam ID		IAK787			IAK788	IAK789	IAK808			
Sampling Date					2018/10/10	2018/10/12	2018/10/12			
COC Number		26188			26188	26188	26188			
	UNITS	**M5/29 - BLANK**	**RDL**	**MDL**	**M5/29- T1**	**M5/29- T2**	**M5/29- T3**	**RDL**	**MDL**	**QC Batch**
Combined Train Aluminum (Al)	ug	131	60	3.0	510	633	439	150	7.5	5798617
Combined Train Antimony (Sb)	ug	ND	3.0	0.080	ND	ND	ND	7.5	0.20	5798617
Combined Train Arsenic (As)	ug	ND	0.80	0.080	ND	ND	ND	2.0	0.20	5798617
Combined Train Barium (Ba)	ug	20.2	1.2	0.80	25.8	23.0	20.9	3.0	2.0	5798617
Combined Train Beryllium (Be)	ug	ND	0.18	0.040	ND	ND	ND	0.45	0.10	5798617
Combined Train Boron (B)	ug	ND	30	2.0	ND	ND	ND	75	5.0	5798617
Combined Train Cadmium (Cd)	ug	ND	0.18	0.040	ND	1.03	ND	0.45	0.10	5798617
Combined Train Calcium (Ca)	ug	ND	300	18	5900	6930	4510	750	45	5798617
Combined Train Chromium (Cr)	ug	ND	3.0	0.10	ND	ND	ND	7.5	0.25	5798617
Combined Train Cobalt (Co)	ug	ND	0.18	0.020	ND	0.51	ND	0.45	0.050	5798617
Combined Train Copper (Cu)	ug	ND	1.5	0.20	ND	4.7	ND	3.8	0.51	5798617
Combined Train Iron (Fe)	ug	ND	60	10	398	419	285	150	25	5798617
Combined Train Lead (Pb)	ug	0.99	0.60	0.040	9.0	15.7	10.2	1.5	0.10	5798617
Combined Train Magnesium (Mg)	ug	34	30	1.0	243	279	174	75	2.5	5798617
Combined Train Manganese (Mn)	ug	ND	1.2	0.10	11.6	10.7	7.9	3.0	0.25	5798617
Combined Train Molybdenum (Mo)	ug	11.8	1.0	0.10	11.7	11.5	11.7	2.5	0.25	5798617
Combined Train Nickel (Ni)	ug	2.8	1.0	0.20	8.5	10.7	4.8	2.5	0.50	5798617
Combined Train Phosphorus (P)	ug	ND	90	10	ND	ND	ND	230	26	5798617
Combined Train Potassium (K)	ug	ND	120	6.0	979	1140	1280	300	15	5798617
Combined Train Selenium (Se)	ug	ND	2.0	0.50	ND	ND	ND	5.0	1.3	5798617
Combined Train Silver (Ag)	ug	ND	0.24	0.040	ND	ND	ND	0.60	0.10	5798617
Combined Train Strontium (Sr)	ug	1.29	0.90	0.060	13.0	14.6	10.4	2.3	0.15	5798617
Combined Train Thallium (Tl)	ug	ND	0.24	0.10	ND	ND	ND	0.60	0.25	5798617
Combined Train Tin (Sn)	ug	66.2	1.2	0.10	104	101	101	3.0	0.25	5798617
Combined Train Titanium (Ti)	ug	18.7	3.0	0.30	36.4	53.2	32.5	7.5	0.75	5798617
Combined Train Vanadium (V)	ug	ND	0.60	0.080	ND	ND	ND	1.5	0.20	5798617
Combined Train Zinc (Zn)	ug	ND	10	1.0	ND	54	ND	25	2.5	5798617

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B8R2682
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

TEST SUMMARY

Maxxam ID: IAK787
Sample ID: M5/29 - BLANK
Matrix: Stack Sampling Train

Collected:
Shipped:
Received: 2018/10/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 3C in HCl Rinse	CV/AA	5811004	2018/10/30	2018/11/01	Meghaben Patel
Mercury 2B in HNO3/H2O2 Imp.	CV/AA	5807891	2018/10/29	2018/10/30	Meghaben Patel
Mercury 3A in HNO3 Rinse	CV/AA	5807885	2018/10/29	2018/10/30	Meghaben Patel
Mercury 3B in KMnO4/H2SO4 Imp.	CV/AA	5809990	2018/10/29	2018/10/31	Meghaben Patel
Mercury 1B in Filter + Rinse (M29)	CV/AA	5798624	2018/10/23	2018/10/30	Meghaben Patel
Metals in Combined Train (6020B m)	ICP1/MS	5798617	2018/10/23	2018/10/25	Nan Raykha
Particulates/Acetone Rinse (M5/315/M201)	BAL	5790014	2018/10/18	2018/10/23	Farag Farag
Particulates/Filter (M5/315/NJATM1/M201)	BAL	5788665	N/A	2018/10/17	Brenda Moore
Final Volume of Acetone Probe Rinse		5790015	N/A	2018/10/23	Farag Farag

Maxxam ID: IAK788
Sample ID: M5/29- T1
Matrix: Stack Sampling Train

Collected: 2018/10/10
Shipped:
Received: 2018/10/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 3C in HCl Rinse	CV/AA	5811004	2018/10/30	2018/11/01	Meghaben Patel
Mercury 2B in HNO3/H2O2 Imp.	CV/AA	5807891	2018/10/29	2018/10/30	Meghaben Patel
Mercury 3A in HNO3 Rinse	CV/AA	5807885	2018/10/29	2018/10/30	Meghaben Patel
Mercury 3B in KMnO4/H2SO4 Imp.	CV/AA	5809990	2018/10/30	2018/10/31	Meghaben Patel
Mercury 1B in Filter + Rinse (M29)	CV/AA	5798624	2018/10/23	2018/10/30	Meghaben Patel
Metals in Combined Train (6020B m)	ICP1/MS	5798617	2018/10/23	2018/10/25	Nan Raykha
Particulates/Acetone Rinse (M5/315/M201)	BAL	5790014	2018/10/18	2018/10/23	Farag Farag
Particulates/Filter (M5/315/NJATM1/M201)	BAL	5788665	N/A	2018/10/17	Brenda Moore
Final Volume of Acetone Probe Rinse		5790015	N/A	2018/10/23	Farag Farag

Maxxam ID: IAK788 Dup
Sample ID: M5/29- T1
Matrix: Stack Sampling Train

Collected: 2018/10/10
Shipped:
Received: 2018/10/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 3C in HCl Rinse	CV/AA	5811004	2018/10/30	2018/11/01	Meghaben Patel

Maxxam ID: IAK789
Sample ID: M5/29- T2
Matrix: Stack Sampling Train

Collected: 2018/10/12
Shipped:
Received: 2018/10/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 3C in HCl Rinse	CV/AA	5811004	2018/10/30	2018/11/01	Meghaben Patel
Mercury 2B in HNO3/H2O2 Imp.	CV/AA	5807891	2018/10/29	2018/10/30	Meghaben Patel
Mercury 3A in HNO3 Rinse	CV/AA	5807885	2018/10/29	2018/10/30	Meghaben Patel
Mercury 3B in KMnO4/H2SO4 Imp.	CV/AA	5809990	2018/10/30	2018/10/31	Meghaben Patel
Mercury 1B in Filter + Rinse (M29)	CV/AA	5798624	2018/10/23	2018/10/30	Meghaben Patel
Metals in Combined Train (6020B m)	ICP1/MS	5798617	2018/10/23	2018/10/25	Nan Raykha
Particulates/Acetone Rinse (M5/315/M201)	BAL	5790014	2018/10/18	2018/10/23	Farag Farag

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Maxxam Job #: B8R2682
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

TEST SUMMARY

Maxxam ID: IAK789
Sample ID: M5/29- T2
Matrix: Stack Sampling Train

Collected: 2018/10/12
Shipped:
Received: 2018/10/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Particulates/Filter (M5/315/NJATM1/M201)	BAL	5788665	N/A	2018/10/17	Brenda Moore
Final Volume of Acetone Probe Rinse		5790015	N/A	2018/10/23	Farag Farag

Maxxam ID: IAK789 Dup
Sample ID: M5/29- T2
Matrix: Stack Sampling Train

Collected: 2018/10/12
Shipped:
Received: 2018/10/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 2B in HNO3/H2O2 Imp.	CV/AA	5807891	2018/10/29	2018/10/30	Meghaben Patel
Mercury 3B in KMnO4/H2SO4 Imp.	CV/AA	5809990	2018/10/30	2018/10/31	Meghaben Patel

Maxxam ID: IAK808
Sample ID: M5/29- T3
Matrix: Stack Sampling Train

Collected: 2018/10/12
Shipped:
Received: 2018/10/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 3C in HCl Rinse	CV/AA	5811004	2018/10/30	2018/11/01	Meghaben Patel
Mercury 2B in HNO3/H2O2 Imp.	CV/AA	5807891	2018/10/29	2018/10/30	Meghaben Patel
Mercury 3A in HNO3 Rinse	CV/AA	5807885	2018/10/29	2018/10/30	Meghaben Patel
Mercury 3B in KMnO4/H2SO4 Imp.	CV/AA	5809990	2018/10/30	2018/10/31	Meghaben Patel
Mercury 1B in Filter + Rinse (M29)	CV/AA	5798624	2018/10/23	2018/10/30	Meghaben Patel
Metals in Combined Train (6020B m)	ICP1/MS	5798617	2018/10/23	2018/10/25	Nan Raykha
Particulates/Acetone Rinse (M5/315/M201)	BAL	5790014	2018/10/18	2018/10/23	Farag Farag
Particulates/Filter (M5/315/NJATM1/M201)	BAL	5788665	N/A	2018/10/17	Brenda Moore
Final Volume of Acetone Probe Rinse		5790015	N/A	2018/10/23	Farag Farag

Maxxam ID: IAK808 Dup
Sample ID: M5/29- T3
Matrix: Stack Sampling Train

Collected: 2018/10/12
Shipped:
Received: 2018/10/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury 3A in HNO3 Rinse	CV/AA	5807885	2018/10/29	2018/10/30	Meghaben Patel

Maxxam ID: IAK811
Sample ID: M201A- BLANK
Matrix: Stack Sampling Train

Collected:
Shipped:
Received: 2018/10/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
2.5 um Particulates on Filter	BAL	5788827	N/A	2018/10/17	Brenda Moore

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Maxxam Job #: B8R2682
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

TEST SUMMARY

Maxxam ID: IAK812
Sample ID: M201A- T1
Matrix: Stack Sampling Train

Collected: 2018/10/10
Shipped:
Received: 2018/10/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
>10um Particulates in Rinse	BAL	5790349	2018/10/18	2018/10/25	Farag Farag
2.5-10um Particulates in Rinse	BAL	5790347	2018/10/18	2018/10/25	Farag Farag
2.5 um Particulates on Filter	BAL	5788827	N/A	2018/10/17	Brenda Moore
<2.5um Particulates in Rinse	BAL	5790345	2018/10/18	2018/10/25	Farag Farag
Final Volume of Acetone Probe Rinse		5790350	N/A	2018/10/25	Farag Farag

Maxxam ID: IAK813
Sample ID: M201A- T2
Matrix: Stack Sampling Train

Collected: 2018/10/12
Shipped:
Received: 2018/10/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
>10um Particulates in Rinse	BAL	5790349	2018/10/18	2018/10/25	Farag Farag
2.5-10um Particulates in Rinse	BAL	5790347	2018/10/18	2018/10/25	Farag Farag
2.5 um Particulates on Filter	BAL	5788827	N/A	2018/10/17	Brenda Moore
<2.5um Particulates in Rinse	BAL	5790345	2018/10/18	2018/10/25	Farag Farag
Final Volume of Acetone Probe Rinse		5790350	N/A	2018/10/25	Farag Farag

Maxxam ID: IAK814
Sample ID: M201A- T3
Matrix: Stack Sampling Train

Collected: 2018/10/12
Shipped:
Received: 2018/10/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
>10um Particulates in Rinse	BAL	5790349	2018/10/18	2018/10/25	Farag Farag
2.5-10um Particulates in Rinse	BAL	5790347	2018/10/18	2018/10/25	Farag Farag
2.5 um Particulates on Filter	BAL	5788827	N/A	2018/10/17	Brenda Moore
<2.5um Particulates in Rinse	BAL	5790345	2018/10/18	2018/10/25	Farag Farag
Final Volume of Acetone Probe Rinse		5790350	N/A	2018/10/25	Farag Farag

Maxxam ID: IAK815
Sample ID: M26(M)/CTM027(M)- BLANK
Matrix: Stack Sampling Train

Collected:
Shipped:
Received: 2018/10/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Halides -Midget H2SO4 Imp	IC/SPEC	5796430	2018/10/22	2018/10/22	Ann-Marie Stern
Ammonium in Midget H2SO4 Imp(CTM-027mod)	IC/SPEC	5789745	2018/10/18	2018/10/18	Rupinder Sihota
Volume of Sulfuric Acid Impinger		5789747	N/A	2018/10/18	Walt Wang

Maxxam ID: IAK816
Sample ID: M26(M)/CTM027(M)- T1
Matrix: Stack Sampling Train

Collected: 2018/10/10
Shipped:
Received: 2018/10/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Halides -Midget H2SO4 Imp	IC/SPEC	5796430	2018/10/22	2018/10/22	Ann-Marie Stern
Ammonium in Midget H2SO4 Imp(CTM-027mod)	IC/SPEC	5789745	2018/10/18	2018/10/18	Rupinder Sihota
Volume of Sulfuric Acid Impinger		5789747	N/A	2018/10/18	Walt Wang

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Maxxam Job #: B8R2682
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

TEST SUMMARY

Maxxam ID: IAK817
Sample ID: M26(M)/CTM027(M)- T2
Matrix: Stack Sampling Train

Collected: 2018/10/12
Shipped:
Received: 2018/10/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Halides -Midget H2SO4 Imp	IC/SPEC	5796430	2018/10/22	2018/10/22	Ann-Marie Stern
Ammonium in Midget H2SO4 Imp(CTM-027mod)	IC/SPEC	5789745	2018/10/18	2018/10/18	Rupinder Sihota
Volume of Sulfuric Acid Impinger		5789747	N/A	2018/10/18	Walt Wang

Maxxam ID: IAK818
Sample ID: M26(M)/CTM027(M)- T3
Matrix: Stack Sampling Train

Collected: 2018/10/12
Shipped:
Received: 2018/10/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hydrogen Halides -Midget H2SO4 Imp	IC/SPEC	5796430	2018/10/22	2018/10/22	Ann-Marie Stern
Ammonium in Midget H2SO4 Imp(CTM-027mod)	IC/SPEC	5789745	2018/10/18	2018/10/18	Rupinder Sihota
Volume of Sulfuric Acid Impinger		5789747	N/A	2018/10/18	Walt Wang

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GENERAL COMMENTS

ELEMENTS BY ICP/MS (STACK SAMPLING TRAIN)

Metals in Combined Train (6020B m): Extra dilution was required for all samples except sample IAK787, due to the matrix.
Post digestion duplicate and spike were done on sample HZU868.
Trace level Ba was observed in the Processed Blank.

Results relate only to the items tested.

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Maxxam Job #: B8R2682
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5789745	RSU	Matrix Spike	Ammonium (NH4)	2018/10/18		92	%	75 - 125
5789745	RSU	Spiked Blank	Ammonium (NH4)	2018/10/18		102	%	90 - 110
5789745	RSU	Method Blank	Ammonium (NH4)	2018/10/18	ND, RDL=3.8		ug	
5789745	RSU	RPD - Sample/Sample Dup	Ammonium (NH4)	2018/10/18	0.46		%	20
5790014	FF	Method Blank	Acetone Rinse Particulate Weight in Acetone Rinse	2018/10/23	ND, RDL=0.5		mg	
5790345	FF	Method Blank	< 2.5 Particulate Weight in Acetone Rinse	2018/10/25	ND, RDL=0.5		mg	
5790347	FF	Method Blank	2.5 - 10 Particulate Weight in Acetone Rinse	2018/10/25	ND, RDL=0.5		mg	
5790349	FF	Method Blank	> 10 Particulate Weight in Acetone Rinse	2018/10/25	ND, RDL=0.5		mg	
5796430	A_S	Matrix Spike	Hydrochloric Acid	2018/10/22		93	%	80 - 120
5796430	A_S	Spiked Blank	Hydrochloric Acid	2018/10/22		101	%	90 - 110
5796430	A_S	Method Blank	Hydrochloric Acid	2018/10/22	ND, RDL=30		ug	
5796430	A_S	RPD - Sample/Sample Dup	Hydrochloric Acid	2018/10/22	1.8		%	20
5798617	N_R	Matrix Spike	Combined Train Aluminum (Al)	2018/10/25		93	%	75 - 125
			Combined Train Antimony (Sb)	2018/10/25		104	%	75 - 125
			Combined Train Arsenic (As)	2018/10/25		107	%	75 - 125
			Combined Train Barium (Ba)	2018/10/25		93	%	75 - 125
			Combined Train Beryllium (Be)	2018/10/25		97	%	75 - 125
			Combined Train Boron (B)	2018/10/25		92	%	75 - 125
			Combined Train Cadmium (Cd)	2018/10/25		102	%	75 - 125
			Combined Train Calcium (Ca)	2018/10/25		94	%	75 - 125
			Combined Train Chromium (Cr)	2018/10/25		98	%	75 - 125
			Combined Train Cobalt (Co)	2018/10/25		102	%	75 - 125
			Combined Train Copper (Cu)	2018/10/25		96	%	75 - 125
			Combined Train Iron (Fe)	2018/10/25		103	%	75 - 125
			Combined Train Lead (Pb)	2018/10/25		104	%	75 - 125
			Combined Train Magnesium (Mg)	2018/10/25		102	%	75 - 125
			Combined Train Manganese (Mn)	2018/10/25		98	%	75 - 125
			Combined Train Molybdenum (Mo)	2018/10/25		101	%	75 - 125
			Combined Train Nickel (Ni)	2018/10/25		101	%	75 - 125
			Combined Train Phosphorus (P)	2018/10/25		97	%	75 - 125
			Combined Train Potassium (K)	2018/10/25		96	%	75 - 125
			Combined Train Selenium (Se)	2018/10/25		107	%	75 - 125
			Combined Train Silver (Ag)	2018/10/25		104	%	75 - 125
			Combined Train Strontium (Sr)	2018/10/25		100	%	75 - 125
			Combined Train Thallium (Tl)	2018/10/25		103	%	75 - 125
			Combined Train Tin (Sn)	2018/10/25		103	%	75 - 125
			Combined Train Titanium (Ti)	2018/10/25		93	%	75 - 125
			Combined Train Vanadium (V)	2018/10/25		98	%	75 - 125
			Combined Train Zinc (Zn)	2018/10/25		100	%	75 - 125
5798617	N_R	MS/MSD RPD	Combined Train Aluminum (Al)	2018/10/25	0		%	20
			Combined Train Antimony (Sb)	2018/10/25	0.41		%	20
			Combined Train Arsenic (As)	2018/10/25	2.3		%	20
			Combined Train Barium (Ba)	2018/10/25	0.70		%	20
			Combined Train Beryllium (Be)	2018/10/25	0.052		%	20
			Combined Train Boron (B)	2018/10/25	1.4		%	20
			Combined Train Cadmium (Cd)	2018/10/25	0		%	20

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Maxxam Job #: B8R2682
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Combined Train Calcium (Ca)	2018/10/25	0		%	20
			Combined Train Chromium (Cr)	2018/10/25	1.3		%	20
			Combined Train Cobalt (Co)	2018/10/25	1.6		%	20
			Combined Train Copper (Cu)	2018/10/25	0.96		%	20
			Combined Train Iron (Fe)	2018/10/25	0		%	20
			Combined Train Lead (Pb)	2018/10/25	1.7		%	20
			Combined Train Magnesium (Mg)	2018/10/25	3.3		%	20
			Combined Train Manganese (Mn)	2018/10/25	1.1		%	20
			Combined Train Molybdenum (Mo)	2018/10/25	0.14		%	20
			Combined Train Nickel (Ni)	2018/10/25	1.0		%	20
			Combined Train Phosphorus (P)	2018/10/25	0		%	20
			Combined Train Potassium (K)	2018/10/25	0		%	20
			Combined Train Selenium (Se)	2018/10/25	0.34		%	20
			Combined Train Silver (Ag)	2018/10/25	1.4		%	20
			Combined Train Strontium (Sr)	2018/10/25	2.0		%	20
			Combined Train Thallium (Tl)	2018/10/25	0.41		%	20
			Combined Train Tin (Sn)	2018/10/25	2.3		%	20
			Combined Train Titanium (Ti)	2018/10/25	1.9		%	20
			Combined Train Vanadium (V)	2018/10/25	1.6		%	20
			Combined Train Zinc (Zn)	2018/10/25	0.71		%	20
5798617	N_R	Spiked Blank	Combined Train Aluminum (Al)	2018/10/25		108	%	85 - 115
			Combined Train Antimony (Sb)	2018/10/25		105	%	85 - 115
			Combined Train Arsenic (As)	2018/10/25		103	%	85 - 115
			Combined Train Barium (Ba)	2018/10/25		105	%	85 - 115
			Combined Train Beryllium (Be)	2018/10/25		106	%	85 - 115
			Combined Train Boron (B)	2018/10/25		119 (1)	%	85 - 115
			Combined Train Cadmium (Cd)	2018/10/25		107	%	85 - 115
			Combined Train Calcium (Ca)	2018/10/25		104	%	85 - 115
			Combined Train Chromium (Cr)	2018/10/25		105	%	85 - 115
			Combined Train Cobalt (Co)	2018/10/25		104	%	85 - 115
			Combined Train Copper (Cu)	2018/10/25		108	%	85 - 115
			Combined Train Iron (Fe)	2018/10/25		109	%	85 - 115
			Combined Train Lead (Pb)	2018/10/25		105	%	85 - 115
			Combined Train Magnesium (Mg)	2018/10/25		109	%	85 - 115
			Combined Train Manganese (Mn)	2018/10/25		105	%	85 - 115
			Combined Train Molybdenum (Mo)	2018/10/25		106	%	85 - 115
			Combined Train Nickel (Ni)	2018/10/25		104	%	85 - 115
			Combined Train Phosphorus (P)	2018/10/25		113	%	85 - 115
			Combined Train Potassium (K)	2018/10/25		107	%	85 - 115
			Combined Train Selenium (Se)	2018/10/25		108	%	85 - 115
			Combined Train Silver (Ag)	2018/10/25		106	%	85 - 115
			Combined Train Strontium (Sr)	2018/10/25		104	%	85 - 115
			Combined Train Thallium (Tl)	2018/10/25		107	%	85 - 115
			Combined Train Tin (Sn)	2018/10/25		105	%	85 - 115
			Combined Train Titanium (Ti)	2018/10/25		105	%	85 - 115
			Combined Train Vanadium (V)	2018/10/25		104	%	85 - 115
			Combined Train Zinc (Zn)	2018/10/25		101	%	85 - 115
5798617	N_R	RPD	Combined Train Aluminum (Al)	2018/10/25	3.0		%	20
			Combined Train Antimony (Sb)	2018/10/25	3.0		%	20
			Combined Train Arsenic (As)	2018/10/25	3.1		%	20
			Combined Train Barium (Ba)	2018/10/25	3.6		%	20
			Combined Train Beryllium (Be)	2018/10/25	3.2		%	20

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Maxxam Job #: B8R2682
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Combined Train Boron (B)	2018/10/25	2.9		%	20
			Combined Train Cadmium (Cd)	2018/10/25	3.8		%	20
			Combined Train Calcium (Ca)	2018/10/25	0		%	20
			Combined Train Chromium (Cr)	2018/10/25	3.3		%	20
			Combined Train Cobalt (Co)	2018/10/25	2.4		%	20
			Combined Train Copper (Cu)	2018/10/25	4.6		%	20
			Combined Train Iron (Fe)	2018/10/25	2.7		%	20
			Combined Train Lead (Pb)	2018/10/25	2.6		%	20
			Combined Train Magnesium (Mg)	2018/10/25	4.6		%	20
			Combined Train Manganese (Mn)	2018/10/25	2.9		%	20
			Combined Train Molybdenum (Mo)	2018/10/25	1.8		%	20
			Combined Train Nickel (Ni)	2018/10/25	3.8		%	20
			Combined Train Phosphorus (P)	2018/10/25	2.4		%	20
			Combined Train Potassium (K)	2018/10/25	0		%	20
			Combined Train Selenium (Se)	2018/10/25	5.3		%	20
			Combined Train Silver (Ag)	2018/10/25	1.4		%	20
			Combined Train Strontium (Sr)	2018/10/25	2.7		%	20
			Combined Train Thallium (Tl)	2018/10/25	3.6		%	20
			Combined Train Tin (Sn)	2018/10/25	3.6		%	20
			Combined Train Titanium (Ti)	2018/10/25	1.2		%	20
			Combined Train Vanadium (V)	2018/10/25	2.5		%	20
			Combined Train Zinc (Zn)	2018/10/25	2.9		%	20
5798617	N_R	Method Blank	Combined Train Aluminum (Al)	2018/10/25	ND, RDL=60		ug	
			Combined Train Antimony (Sb)	2018/10/25	ND, RDL=3.0		ug	
			Combined Train Arsenic (As)	2018/10/25	ND, RDL=0.80		ug	
			Combined Train Barium (Ba)	2018/10/25	2.9, RDL=1.2		ug	
			Combined Train Beryllium (Be)	2018/10/25	ND, RDL=0.18		ug	
			Combined Train Boron (B)	2018/10/25	ND, RDL=30		ug	
			Combined Train Cadmium (Cd)	2018/10/25	ND, RDL=0.18		ug	
			Combined Train Calcium (Ca)	2018/10/25	ND, RDL=300		ug	
			Combined Train Chromium (Cr)	2018/10/25	ND, RDL=3.0		ug	
			Combined Train Cobalt (Co)	2018/10/25	ND, RDL=0.18		ug	
			Combined Train Copper (Cu)	2018/10/25	ND, RDL=1.5		ug	
			Combined Train Iron (Fe)	2018/10/25	ND, RDL=60		ug	
			Combined Train Lead (Pb)	2018/10/25	ND, RDL=0.60		ug	
			Combined Train Magnesium (Mg)	2018/10/25	ND, RDL=30		ug	
			Combined Train Manganese (Mn)	2018/10/25	ND, RDL=1.2		ug	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Combined Train Molybdenum (Mo)	2018/10/25	ND, RDL=1.0		ug	
			Combined Train Nickel (Ni)	2018/10/25	ND, RDL=1.0		ug	
			Combined Train Phosphorus (P)	2018/10/25	ND, RDL=90		ug	
			Combined Train Potassium (K)	2018/10/25	ND, RDL=120		ug	
			Combined Train Selenium (Se)	2018/10/25	ND, RDL=2.0		ug	
			Combined Train Silver (Ag)	2018/10/25	ND, RDL=0.24		ug	
			Combined Train Strontium (Sr)	2018/10/25	ND, RDL=0.90		ug	
			Combined Train Thallium (Tl)	2018/10/25	ND, RDL=0.24		ug	
			Combined Train Tin (Sn)	2018/10/25	ND, RDL=1.2		ug	
			Combined Train Titanium (Ti)	2018/10/25	ND, RDL=3.0		ug	
			Combined Train Vanadium (V)	2018/10/25	ND, RDL=0.60		ug	
			Combined Train Zinc (Zn)	2018/10/25	ND, RDL=10		ug	
5798617	N_R	RPD - Sample/Sample Dup	Combined Train Aluminum (Al)	2018/10/25	0.12		%	20
			Combined Train Antimony (Sb)	2018/10/25	NC		%	20
			Combined Train Arsenic (As)	2018/10/25	NC		%	20
			Combined Train Barium (Ba)	2018/10/25	0.30		%	20
			Combined Train Beryllium (Be)	2018/10/25	NC		%	20
			Combined Train Boron (B)	2018/10/25	NC		%	20
			Combined Train Cadmium (Cd)	2018/10/25	NC		%	20
			Combined Train Calcium (Ca)	2018/10/25	0.074		%	20
			Combined Train Chromium (Cr)	2018/10/25	NC		%	20
			Combined Train Cobalt (Co)	2018/10/25	NC		%	20
			Combined Train Copper (Cu)	2018/10/25	NC		%	20
			Combined Train Iron (Fe)	2018/10/25	2.3		%	20
			Combined Train Lead (Pb)	2018/10/25	0.94		%	20
			Combined Train Magnesium (Mg)	2018/10/25	6.1		%	20
			Combined Train Manganese (Mn)	2018/10/25	0.0060		%	20
			Combined Train Molybdenum (Mo)	2018/10/25	0.0041		%	20
			Combined Train Nickel (Ni)	2018/10/25	2.0		%	20
			Combined Train Phosphorus (P)	2018/10/25	NC		%	20
			Combined Train Potassium (K)	2018/10/25	1.6		%	20
			Combined Train Selenium (Se)	2018/10/25	NC		%	20
			Combined Train Silver (Ag)	2018/10/25	NC		%	20
			Combined Train Strontium (Sr)	2018/10/25	2.0		%	20
			Combined Train Thallium (Tl)	2018/10/25	NC		%	20
			Combined Train Tin (Sn)	2018/10/25	0.25		%	20
			Combined Train Titanium (Ti)	2018/10/25	1.1		%	20
			Combined Train Vanadium (V)	2018/10/25	NC		%	20
			Combined Train Zinc (Zn)	2018/10/25	NC		%	20

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5798624	MPD	Reagent Blank	1B Mercury (Hg)	2018/10/30	ND, RDL=0.015		ug	
5798624	MPD	Matrix Spike	1B Mercury (Hg)	2018/10/30		103	%	85 - 115
5798624	MPD	MS/MSD RPD	1B Mercury (Hg)	2018/10/30	2.1		%	20
5798624	MPD	Spiked Blank	1B Mercury (Hg)	2018/10/30		103	%	90 - 110
5798624	MPD	RPD	1B Mercury (Hg)	2018/10/30	2.8		%	20
5798624	MPD	Method Blank	1B Mercury (Hg)	2018/10/30	ND, RDL=0.015		ug	
5798624	MPD	RPD - Sample/Sample Dup	1B Mercury (Hg)	2018/10/30	18		%	20
5807885	MPD	Matrix Spike(IAK808)	3A Mercury (Hg)	2018/10/30		103	%	85 - 115
5807885	MPD	MS/MSD RPD	3A Mercury (Hg)	2018/10/30	0.78		%	20
5807885	MPD	Spiked Blank	3A Mercury (Hg)	2018/10/30		102	%	90 - 110
5807885	MPD	RPD	3A Mercury (Hg)	2018/10/30	1.3		%	20
5807885	MPD	Method Blank	3A Mercury (Hg)	2018/10/30	ND, RDL=0.005		ug	
5807885	MPD	RPD - Sample/Sample Dup	3A Mercury (Hg)	2018/10/30	NC		%	20
5807891	MPD	Matrix Spike(IAK789)	2B Mercury (Hg)	2018/10/30		102	%	85 - 115
5807891	MPD	MS/MSD RPD	2B Mercury (Hg)	2018/10/30	2.9		%	20
5807891	MPD	Spiked Blank	2B Mercury (Hg)	2018/10/30		102	%	90 - 110
5807891	MPD	RPD	2B Mercury (Hg)	2018/10/30	1.7		%	20
5807891	MPD	Method Blank	2B Mercury (Hg)	2018/10/30	ND, RDL=0.015		ug	
5807891	MPD	RPD - Sample/Sample Dup	2B Mercury (Hg)	2018/10/30	5.2		%	20
5809990	MPD	Reagent Blank	3B Mercury (Hg)	2018/10/31	ND, RDL=0.013		ug	
5809990	MPD	Matrix Spike(IAK789)	3B Mercury (Hg)	2018/10/31		100	%	85 - 115
5809990	MPD	MS/MSD RPD	3B Mercury (Hg)	2018/10/31	0.90		%	20
5809990	MPD	Spiked Blank	3B Mercury (Hg)	2018/10/31		101	%	90 - 110
5809990	MPD	RPD	3B Mercury (Hg)	2018/10/31	1.6		%	20
5809990	MPD	Method Blank	3B Mercury (Hg)	2018/10/31	ND, RDL=0.02		ug	
5809990	MPD	RPD - Sample/Sample Dup	3B Mercury (Hg)	2018/10/31	0.24		%	20
5811004	MPD	Reagent Blank	3C Mercury (Hg)	2018/11/01	ND, RDL=0.013		ug	
5811004	MPD	Matrix Spike(IAK788)	3C Mercury (Hg)	2018/11/01		96	%	85 - 115
5811004	MPD	MS/MSD RPD	3C Mercury (Hg)	2018/11/01	1.5		%	20
5811004	MPD	Spiked Blank	3C Mercury (Hg)	2018/11/01		104	%	90 - 110
5811004	MPD	RPD	3C Mercury (Hg)	2018/11/01	2.9		%	20
5811004	MPD	Method Blank	3C Mercury (Hg)	2018/11/01	ND, RDL=0.013		ug	
5811004	MPD	RPD - Sample/Sample Dup	3C Mercury (Hg)	2018/11/01	1.6		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Reagent Blank: A blank matrix containing all reagents used in the analytical procedure. Used to determine any analytical contamination.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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Maxxam Job #: B8R2682
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST. MARYS
Your P.O. #: 1804600

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Frank Mo, B.Sc., Inorganic Lab. Manager

John Bowman, Analyst I

Walt Wang, Supervisor, Inorganics

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

B8R2682

Chain of Custody Form - AIR

11569

Page 1 of 2

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6740 Campobello Rd
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Toll Free: 1-800-668-0639
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Fax: (905) 817-5777

CLIENT INFORMATION SECTION

Company Name: RWDI
Project Manager: KIRK EASTO
e-mail: KIRK.EASTO@RWDI.COM
Address: GUELPH ON

Phone: 519-823-1311 Fax:

Sampled by: ANE/JBF/MP

ANALYSIS REQUESTED

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time	ENVIRONMENT CANADA RM/2	USEPA METHOD 29 uSEPA M#5	USEPA METHOD 26	USEPA METHOD 201
T1-ALT FUELS-SVOC(6 PCS)			10/10/18		✓			
T2-ALT FUELS SVOC (6 PCS)			10/12/18		✓			
T3-ALT FUELS-SVOC(6 PCS)			10/12/18		✓			
T1-ALT FUELS-M29-(7 PCS)			10/10/18			✓		
T2-ALT FUELS-M29-(7PCS)			10/12/18			✓		
T3-ALT FUELS-M29-(7PCS)			10/12/18			✓		
T1/T2/T3-ALT FUELS-M26(3PCS)			10/10/18				✓	
T1-ALT FUELS-PM10(4 PCS)			10/10/18					✓
T2-ALT FUELS-PM10 (4PCS)			10/12/18					✓
T3-ALT FUELS-PM10(4PCS)			10/12/18					✓
PM10 BLANK (1PC)								✓
M29-BLANK (7 PCS						✓		

TAT Requirement
- STD 10 Business day ☑
- Rush 5 Business day * ☐
- Rush 2 Business day * ☐
- * need approval from Maxxam

PROJECT INFORMATION
Project #: 1804600
Name: ST MARYS
PO #: 1804600
Maxxam Quote #:
Maxxam Contact:

REPORTING REQUIREMENTS
Summary Report only ☐
EDD ☐
Regulation

Notes

PROJECT SPECIFIC COMMENTS

Client Signature: JOE FROST
Affiliation: TECH.
Date/Time: 10/15/18

Received by: [signature]
Affiliation:
Date/Time: 2018/10/15 15:21

12.1/11.0/11.8

COC-1031 (04/13) - Air

(VOST) B8R2640 / B8R2682

Chain of Custody Form - AIR

11570

Maxxam

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Mississauga Ontario ,L5N 2L8
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Phone: (905) 817-5700
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Page 2 of 2

CLIENT INFORMATION SECTION

Company Name: RWDI
Project Manager: KIER CASTO
e-mail:
Address:
Phone:
Fax:
Sampled by:

ANALYSIS REQUESTED

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time	ENVIRONMENT CANADA RM 12	USEPA METHOD 26	USEPA SW846 0030 VOST										
SVOC- BLANK (6FCS)					✓												
M26- BLANK						✓											
VOST- BLANK							✓										
VOST - ALT FUELS - T_1			10/12/18				✓										
VOST - ALT FUELS - T_2			10/12/18				✓										
VOST - ALT FUELS - T_3			10/12/18				✓										

TAT Requirement

STD 10 Business day ☐
Rush 5 Business day * ☐
Rush 2 Business day * ☐
* need approval from Maxxam

PROJECT INFORMATION

Project #: 1804600
Name:
PO #: 1804600
Maxxam Quote #:
Maxxam Contact:

REPORTING REQUIREMENTS

Summary Report only ☐
EDD ☐
Regulation

Notes

PROJECT SPECIFIC COMMENTS

Client Signature:
Affiliation:
Date/Time:

Received by: See page one 2018/10/15
Affiliation:
Date/Time:

COC-1031 (04/13) - Air

APPENDIX L

Alternative fuel trial data
Data run

Start:	9/28/2018 0:00
Finish:	10/16/2018 0:00

Tags

NO	\\bowcntpi\K1_AI2_63_3652.PNT	ppm
NO2	\\bowcntpi\K1_AI5_63_3652.PNT	ppm
SO2	\\bowcntpi\K1_AI1_63_3652.PNT	ppm
Opacity	\\bowcntpi\K1_AI1_63_365.PNT	%
Temperature of gases leaving the kiln	\\bowcntpi\K1_TI1_63_410.PNT	C
Temperature of gases K5 top	\\bowcntpi\K1_TI8_63_210.avg1	C
Temperature of gases leaving the calciner	\\bowcntpi\K1_TI8_63_2203.PNT	C
Residual Oxygen at back end of the kiln	\\bowcntpi\K1_AI3_63_265.PNT	%
Residual Oxygen at calciner down comer duct	\\bowcntpi\K1_AI1_63_203.PNT	%
CO at back end of the kiln?	\\bowcntpi\K1_AI1_63_265.PNT	ppm
CO at calciner down comer duct	\\bowcntpi\K1_AI2_63_203.PNT	ppm
THC (as CH4) in kiln stack gas	\\bowcntpi\K1_AI7_63_3652.PNT	ppm
Kiln negative pressure	\\bowcntpi\K1_PI2_63_410.PNT	kPa
Calciner negative pressure	\\bowcntpi\K1_PI1_63_252.PNT	kPa
Preheater tower negative pressure	\\bowcntpi\K1_PI1_63_210.PNT	kPa
Raw mill negative pressure	\\bowcntpi\RM1_PI2_53_201.PNT	kPa
Raw material feed rate	\\bowcntpi\RM1_PIC_53_201.MEAS	t/h
Conventional fuel feed rate - kiln	\\bowcntpi\K1_FI1_63_696.PNT	t/h
Conventional fuel feed rate - calciner	\\bowcntpi\K1_FI1_63_693.PNT	t/h
LCF/Alt fuel feed rate - calciner	\\bowcntpi\K1_FI1_63_935.PNT	t/h
Clinker hourly production rate	\\bowcntpi\K1_FI1_63_410	t/d
Calciner feed	\\bowcntpi\K1_FI1_63_124.PNT	t/h
Kiln feed	\\bowcntpi\K1_FI1_63_125.PNT	t/h

Time stamp		NO	NO2	SO2	Opacity	Temperature of gases leaving the kiln	Temperature of gases K5 top	Temperature of gases leaving the calciner	Residual Oxygen at back end of the kiln	Residual Oxygen at calciner down comer duct	CO at back end of the kiln?	CO at calciner down comer duct	THC (as CH4) in kiln stack gas	egative pre	negative p	ower negat	l negative p	Raw material feed rate	Conventional fuel feed rate - kiln	Conventional fuel feed rate - calciner	LCF/Alt fuel feed rate - calciner	Clinker hourly production rate	alciner fee	Kiln feed
		ppm	ppm	ppm	%	C	C	C	%	%	ppm	ppm	ppm	kPa	kPa	kPa	kPa	t/h	t/h	t/h	t/h	t/d	t/h	t/h
30-Sep-18 00:00:00	30-Sep-18 01:00:00	173.3654	2.738992	275.0719	3.828239	0	827.0998	903.5442	2.216534	4.728168	153.4146	716.6212	70.46875	-0.04747	0.521972	8.785912	1.114247	437.586	9.210352	14.34132	0	5323.246	291.5882	91.99202
30-Sep-18 01:00:00	30-Sep-18 02:00:00	183.7913	2.930928	270.3515	3.900838	0	826.9714	903.2802	2.425307	4.553136	95.87656	717.342	70.46875	-0.05501	0.538376	8.805094	1.085166	445.14	9.129775	14.99476	0	5429.752	297.7805	93.92014
30-Sep-18 02:00:00	30-Sep-18 03:00:00	155.5509	3.122864	320.0489	3.885381	0	826.8431	903.9671	2.008482	4.332349	439.1262	729.1799	70.46875	-0.05558	0.543648	8.86103	1.080819	446.0321	9.111729	15.43588	0	5493.5	301.506	95.20466
30-Sep-18 03:00:00	30-Sep-18 04:00:00	181.611	3.709093	344.5183	4.058673	0	826.7148	904.4062	2.379303	4.576131	172.7648	722.2632	70.46875	-0.06662	0.587576	9.104135	0.553902	130.4516	8.986463	15.4447	0	5516.233	302.8191	95.51321
30-Sep-18 04:00:00	30-Sep-18 05:00:00	170.6701	4.224558	432.3579	4.200896	0	826.5761	903.4618	2.345647	4.824553	169.7473	730.9634	70.46875	-0.06987	0.622161	9.313986	0.230302	0.203616	9.100813	15.3081	0	5457.767	299.475	94.78711
30-Sep-18 05:00:00	30-Sep-18 06:00:00	159.61	4.020632	498.1866	4.227555	0	826.3836	903.5744	13.80086	4.326168	89.52642	734.6098	70.46875	-0.0632	0.601375	9.233144	0.258054	0.17808	8.988058	15.84863	0	5517.956	302.8765	95.48402
30-Sep-18 06:00:00	30-Sep-18 07:00:00	159.564	3.816707	528.9251	4.235285	0	826.1835	904.3658	20.84263	4.013956	62.76829	745.4203	70.46875	-0.0666	0.592464	9.089151	0.221946	0.152544	8.810617	16.00755	0	5544.336	303.9913	96.09771
30-Sep-18 07:00:00	30-Sep-18 08:00:00	194.2665	2.950911	336.134	4.175767	0	825.9833	903.8947	8.713003	4.271642	172.2236	766.6114	70.46875	-0.07341	0.597456	9.186474	0.228587	0.127008	8.69052	15.8342	0	5560.559	303.9405	96.15651
30-Sep-18 08:00:00	30-Sep-18 09:00:00	160.2715	3.92025	370.4726	4.172257	0	825.7832	904.284	2.951452	4.411623	115.9112	728.6094	9.476444	-0.07703	0.596997	9.255903	0.243461	0.101472	8.632392	15.76164	0	5560.079	303.9872	96.12152
30-Sep-18 09:00:00	30-Sep-18 10:00:00	157.5359	3.912904	372.3146	4.21534	0	825.7004	904.6228	2.326209	4.986883	478.1309	706.836	30.40902	-0.07538	0.59568	9.146879	0.27227	0.075936	8.773576	14.85932	0	5362.963	292.6033	92.72911
30-Sep-18 10:00:00	30-Sep-18 11:00:00	171.9293	3.905558	363.6384	4.19438	0	826.3604	904.7947	2.478806	5.187747	218.6826	701.7154	124.9603	-0.07481	0.599638	9.039355	0.253862	0.0504	8.835268	14.24195	0	5244.603	285.6353	89.94797
30-Sep-18 11:00:00	30-Sep-18 12:00:00	167.8936	3.898212	340.6642	4.148105	0	827.151	904.2272	2.488194	5.253849	229.0086	714.8939	118.3019	-0.07164	0.560002	8.94192	0.377719	18.11589	8.858091	13.94388	0	5120.385	278.435	88.10093
30-Sep-18 12:00:00	30-Sep-18 13:00:00	149.837	2.851974	213.6409	3.796727	0	827.9416	904.0872	2.022548	5.104307	978.3906	745.1098	181.8591	-0.06169	0.49296	8.83192	1.185084	421.3215	8.895824	13.52692	0	5103.813	276.9301	90.09512
30-Sep-18 13:00:00	30-Sep-18 14:00:00	150.8824	2.909357	218.1336	3.824461	0	828.7321	904.3723	1.887319	5.318963	816.1896	706.6736	178.2193	-0.06455	0.515562	8.867228	1.197954	413.7491	8.887312	13.24484	0	4858.856	278.376	92.43767
30-Sep-18 14:00:00	30-Sep-18 15:00:00	147.6446	2.992002	179.8013	3.836066	0	829.5227	903.6004	2.027471	5.048962	1087.359	716.4246	165.2394	-0.06789	0.518304	8.841485	1.153922	420.0934	8.654274	13.42424	0	5169.091	288.0177	93.72089
30-Sep-18 15:00:00	30-Sep-18 16:00:00	152.7992	3.074647	181.976	3.804691	0	830.2994	904.071	2.378187	5.031157	682.3054	719.7381	159.0998	-0.08088	0.532007	8.812331	1.21612	404.2067	8.485799	13.55017	0	5238.544	286.0375	90.29938
30-Sep-18 16:00:00	30-Sep-18 17:00:00	160.0807	3.157291	231.5916	3.825813	0	829.8906	901.7018	2.692023	3.975103	425.5074	725.625	167.2778	-0.0508	0.441325	8.738151	1.178798	406.1147	8.505449	14.69107	0	5303.673	291.2376	91.76243
30-Sep-18 17:00:00	30-Sep-18 18:00:00	180.0705	3.239936	196.5224	3.829596	0	828.7208	905.6138	7.142495	3.25995	1310.266	735.6687	170.7052	-0.04945	0.444822	8.749199	1.15822	410.6258	7.94684	15.52088	0	5435.309	298.819	94.78678
30-Sep-18 18:00:00	30-Sep-18 19:00:00	142.3822	3.322581	139.7338	3.780769	0	827.4544	903.6316	13.22797	4.206182	37.90571	678.8785	159.179	-0.05302	0.461509	8.656674	1.162137	412.729	8.22909	14.57452	0	5163.337	282.5712	89.79388
30-Sep-18 19:00:00	30-Sep-18 20:00:00	182.8199	3.405056	234.0183	3.85717	0	825.5756	904.3141	11.41507	4.236226	132.5082	683.0799	163.3952	-0.0482	0.476644	8.71373	1.133877	418.0536	8.503894	14.48097	0	5342.117	293.5608	92.76825
30-Sep-18 20:00:00	30-Sep-18 21:00:00	190.0818	3.438451	233.2667	3.895243	0	824.6655	904.3118	4.698525	4.557981	320.7417	676.1191	164.9968	-0.05546	0.466432	8.778949	1.148671	421.1314	8.763281	14.12379	0	5260.898	288.8422	91.10401
30-Sep-18 21:00:00	30-Sep-18 22:00:00	179.3934	3.433194	248.4646	3.879981	0	825.1334	904.0583	4.365074	4.555749	607.9192	677.3022	176.5422	-0.0623	0.482787	8.78296	1.173078	420.2385	8.8572	14.01917	0	5241.412	287.6864	90.74022
30-Sep-18 22:00:00	30-Sep-18 23:00:00	179.5234	3.427938	277.9771	3.941044	0	825.6063	902.6632	4.314369	4.329463	1078.253	674.0271	175.1031	-0.05878	0.468619	8.76262	1.164892	422.4491	8.748677	14.50671	0	5290.733	290.5054	91.69496
30-Sep-18 23:00:00	01-Oct-18 00:00:00	186.8663	3.641075	337.8484	4.069026	0	826.0793	902.7741	4.775978	3.836796	444.5552	687.9016	153.1829	-0.05687	0.468995	8.700337	0.870522	274.7553	8.435534	14.9963	0	5411.101	297.5298	94.00719
01-Oct-18 00:00:00	01-Oct-18 01:00:00	173.1917	3.196355	314.9362	4.079181	0	826.5522	902.525	4.778554	3.973996	593.1363	706.1309	153.3228	-0.06653	0.519193	8.962099	0.969742	297.0896	8.456546	15.33001	0	5480.218	300.5043	94.66013
01-Oct-18 01:00:00	01-Oct-18 02:00:00	193.7388	2.815897	245.9058	4.17443	0	827.0252	904.8012	4.992285	3.496504	185.4978	723.7629	168.3263	-0.05359	0.492544	8.858373	1.093516	419.7905	8.276977	15.66585	0	5547.709	303.9752	96.07764
01-Oct-18 02:00:00	01-Oct-18 03:00:00	204.9455	2.929906	244.6347	4.14138	0	827.0977	904.0042	5.578553	3.272957	82.15827	721.8319	166.6636	-0.05278	0.49357	8.840709	1.112738	420.0355	8.091455	15.93506	0	5548.33	303.9652	95.96942
01-Oct-18 03:00:00	01-Oct-18 04:00:00	201.3326	3.043915	215.1144	4.147614	0	824.7888	903.3232	6.102227	3.456056	77.25399	701.4568	165.1033	-0.05967	0.503499	8.812892	1.115116	421.5522	7.818142	15.68081	0	5540.395	303.9847	96.04035
01-Oct-18 04:00:00	01-Oct-18 05:00:00	195.9738	3.157924	193.0728	4.144666	0	822.0865	904.4502	7.374929	3.24937	70.24286	703.5998	166.1645	-0.05586	0.497525	8.750735	1.117513	429.4433	7.603901	16.02523	0	5534.962	303.9806	96.07259
01-Oct-18 05:00:00	01-Oct-18 06:00:00	122.6157	8.96301	253.4408	4.191331	0	819.3849	903.9586	20.94906	3.333754	63.23173	718.6976	183.5595	-0.05549	0.516843	8.615904	1.09498	431.7193	8.019761	15.94412	0	5465.516	299.9865	94.8588
01-Oct-18 06:00:00	01-Oct-18 07:00:00	142.6984	14.09514	249.1958	4.059259	0	816.7655	904.2116	20.47925	3.39922	56.2206	708.707	191.3445	-0.0573	0.525629	8.676416	1.095944	434.4722	8.120543	15.55702	0	5504.92	302.1614	95.32337
01-Oct-18 07:00:00	01-Oct-18 08:00:00	176.5279	3.067261	249.8736	3.891892	0	816.1216	903.4832	6.224721	3.241582	49.20948	718.1674	189.2131	-0.05904	0.530347	8.701052	1.117296	431.6396	8.057656	15.67192	0	5535.23	304.0217	96.08496
01-Oct-18 08:00:00	01-Oct-18 09:00:00	151.9419	2.497997	224.4715	3.911386	0	818.4215	904.0785	7.003987	3.345777	50.01016	732.1622	158.0381	-0.05819	0.516866	8.745805	1.123747	426.1183	8.181907	15.4894	0	5535.239	303.9624	96.14595
01-Oct-18 09:00:00	01-Oct-18 10:00:00	162.1233	2.360333	221.4754	3.873135	0	820.7534	904.145	20.92643	3.234728	42.74205	730.1383	146.9092	-0.0572	0.512817	8.847852	1.130904	423.3701	8.192102	15.92515	0	5535.778	303.9865	96.13504
01-Oct-18 10:00:00	01-Oct-18 11:00:00	150.8252	2.368796	151.6647	3.781214	0	822.8939	904.5589	20.91753	4.126489	36.07178	738.0129	142.8131	-0.06366	0.559024	8.844721	1.11574	428.8028	8.221665	14.91015	0	5468.805	300.3169	94.98401
01-Oct-18 11:00:00	01-Oct-18 12:00:00	157.2297	2.377259	147.7928	3.811313	0	823.1263	903.838	8.826215	4.16914	40.05183	723.7807	142.7354	-0.05742	0.529737	8.79718	1.141155	429.4671	8.286377	15.14203	0	5353.037	293.2568	92.39378
01-Oct-18 12:00:00	01-Oct-18 13:00:00	150.8926	2.385722	135.8223	3.823073	0	822.868	904.9894	5.982174	4.819633	162.1907	725.0196	140.9961	-0.06425	0.569722	8.815641	1.136293	428.2125	8.405498	14.36917	0	5303.09	290.6025	91.75659
01-Oct-18 13:00:00	01-Oct-18 14:00:00	159.363	2.394185	167.2908	3.814588	0	822.6096	903.2675	5.440881	4.635152	319.3629	704.3152	139.2528	-0.05849	0.539547	8.853857	1.137137	428.4928	8.725419	14.78003	0	5279.779	287.5853	92.53396
01-Oct-18 14:00:00	01-Oct-18 15:00:00	155.5857	2.402648	149.2612	3.866755	0	822.3513	903.7693	6.046347	4.052604	77.16057	715.6482	139.5063	-0.08131	0.541958	8.896579	1.163549	427.9083	8.310683	15.72322	0	5381.32	291.8077	96.24715
01-Oct-18 15:00:00	01-Oct-18 16:00:00	150.3049	2.411111	103.4772	3.767341	0	822.093	905.301	6.119066	4.964239	210.0654	726.9153	161.105	-0.06957	0.553486	8.845587	1.178329	429.1209	8.205385	14.79942	0	5163.523	282.0822	89.92869
01-Oct-18 16:00:00	01-Oct-18 17:00:00	142.6946	2.418709	127.0072	3.750379	0	821.8346	904.2618	6.386774	5.742325	62.09534	717.7411	143.1206	-0.07443	0.510367	8.728842	1.155375	422.8837	8.403802	13.74614	0	4820.774	262.4243	82.99533
01-Oct-18 17:00:00	01-Oct-18 18:00:00	154.9724	2.420159	150.2818	3.764843	0	821.5763	903.6585	6.143038	5.366765	106.4011	703.789	153.686	-0.07403	0.5107	8.743003	1.19386	425.2234	8.625959	13.89295	0	4949.38	269.6612	85.27047
01-Oct-18 18:00:00	01-Oct-18 19:00:00	154.266	2.420406	147.6375	3.728687	30.65667	821.3363	903.2593	15.13885	4.861568	59.26506	691.0478	149.3257	-0.06421	0.489081	8.728053	1.177889	420.3515	8.0871	14.74898	0	5037.589	274.3419	87.50117
01-Oct-18 19:00:00	01-Oct-18 20:00:00	158.9168	2.420654	209.0516	3.813522	932.4254	821.1927	904.0216	12.37481	4.804328	90.43598	699.5325	143.1388	-0.05909	0.505821	8.720717	1.184733	423.4018	8.418151	14.63937	0	5195.188	284.1585	89.9177
01-Oct-18 20:00:00	01-Oct-18 21:00:00	172.5281	2.420901	182.001	3.784156	1128.386	821.063	904.1418	6.103185	4.869878	141.5722	690.1356	147.0434	-0.0595	0.507502	8.835818	1.178691	418.6722	8.491609	14.43031	0	5272.901	288.7378	91.10768
01-Oct-18 21:00:00	01-Oct-18 22:00:00	174.9969	2.421148	198.222	3.76507	1124.924	820.9333	903.9524	5.819377	4.800865	160.3144	681.457	152.8199	-0.05599	0.500698	8.850787	1.177357	411.3221	8.493652	14.53034	0	5310.672	290.978	91.81812
01-Oct-18 22:00:00	01-Oct-18 23:00:00	183.1423	2.421395	205.6837	3.821854	1127.339	820.8036	903.6703	5.89085	4.530321	174.954	656.4501	156.9303	-0.05018	0.463864	8.837012	1.137679	415.8928	8.493661	14.77432	0	5287.987	289.6014	91.31756
01-Oct-18 23:00:00	02-Oct-18 00:00:00	172.5051	2.421643	204.2172	3.84179	1122.877	820.6739	904.0779	5.964546	4.414259	209.1364	649.6089	157.8144	-0.0527	0.489358	8.857771	1.117595	416.1758	8.491542	15.08345	0	5343.457	292.7344	92.48361
02-Oct-18 00:00:00	02-Oct-18 01:00:00	165.0753	2.409897	190.8191	3.808125	1119.067	820.5443	903.4488	6.335527	4.355745	167.2692	669.0158	146.9116	-0.05546	0.515457	8.85374	1.126666	416.5788	8.483244	15.24451	0	5390.155	295.5958	93.34252
02-Oct-18 01:00:00	02-Oct-18 02:00:00	162.6192	2.341065	208.3997	3.822033	1141.772	820.4146	903.0892	6.566175	3.842161	142.4375	698.8841	158.3061	-0.0562	0.510984	8.862953	1.134192	420.5815	8.488387	15.84037	0	5473.511	300.2722	94.74031
02-Oct-18 02:00:00	02-Oct-18 03:00:00	160.3025	2.264829	218.9613	3.822819	1145.101	820.2774	904.6446	6.47573	3.617732	123.013	718.907	163.9588	-0.05517	0.509355	8.849124	1.126501	421.448	8.417597	16.27395	0	5536.833	304.0344	95.86397
02-Oct-18 03:00:00	02-Oct-18 04:00:00	148.9178	2.188592	217.5691	3.853741	1131.825	820.1094	904.3644	6.199677	3.999022	259.4259	686.4637	157.9649	-0.06381	0.537948	8.874966	1.134492	423.4292	8.4757	15.64015	0	5470.773	300.2253	95.05854
02-Oct-18 04:00:00	02-Oct-18 05:00:00	151.6715	2.112356	211.1056	3.839837	1139.868	819.9381	904.1008	6.268423	4.122113	260.6491	669.2811	159.2326	-0.06252	0.54976	8.841208	1.088882	425.2124	8.482063	15.62419	0	5361.483	293.8799	92.81632
02-Oct-18 05:00:00	02-Oct-18 06:00:00	150.0524	2.03612	241.528	3.987582	1148.159	819.7668	904.2762	20.39852	4.137625	47.56877	662.3255	156.3359	-0.05864	0.553567	8.668001	1.098599	424.2269	8.493591	15.27298	0	5224.256	285.8367	90.52234
02-Oct-18 06:00:00	02-Oct-18 07:00:00	152.1025	1.959884	231.4183	3.936148	1143.095	819.5955	904.1792	19.50361	4.38978	47.96023	656.748	156.4917	-0.05646	0.558291	8.57081	1.102332	422.209	8.484587	14.84747	0	5160.863	282.8051	89.26614
02-Oct-18 07:00:00	02-Oct-18 08:00:00	197.6249	1.689863	220.407	3.946662	1147.77	819.4242	903.8626	6.83678	4.333135	159.9728	658.9222	159.122	-0.05393	0.551436	8.644292	1.132995	427.6251	8.48518	15.1628	0	5228.973	287.5226	90.83599
02-Oct-18 08:00:00	02-Oct-18 09:00:00	148.439	2.168307	153.9087	3.877053	1152.434	819.3045	904.0391	6.598709	3.745686	368.2078	689.9981	165.9916	-0.05559	0.578866	8.785454	1.162342	431.2352	8.463531	15.56648	0	5369.208	295.6818	93.21426
02-Oct-18 09:00:00	02-Oct-18 10:00:00	157.8818	2.220453	146.0238	3.850585	1141.671	819.3964	904.0901	6.600976	3.894056	212.8501	683.766	164.9481	-0.06453	0.590891	8.838192	1.135673	412.9476	8.48193	15.37991	0	5307.388	292.1618	92.49489
02-Oct-18 10:00:00	02-Oct-18 11:00:00	152.722	2.272599	152.6525	3.795217	1142.058	819.511	902.9828	6.720261	3.710253	127.6416	689.5425	162.6855	-0.0612	0.588887	8.885014	1.163309	403.275	8.463428	15.31941	0	5315.696	292.6158	92.34776
02-Oct-18 11:00:00	02-Oct-18 12:00:00	156.9265	2.324745	175.5982	3.857733	1153.185	819.6256	904.1278	6.971537	3.136121	106.5393	736.2544	163.6005	-0.06606	0.581286	8.890781	1.158479	409.7751	8.344141	16.04478	0	5369.601	295.8635	93.70833
02-Oct-18 12:00:00	02-Oct-18 13:00:00	174.1976	2.376891	151.1035	3.798351	1163.076	819.7402	905.7349	7.111067	4.287415	92.34135	663.2949	164.7665	-0.07263	0.574517	8.748607	1.134905	411.1567	8.599012	14.47516	0	4989.594	273.7499	86.65046
02-Oct-18 13:00:00	02-Oct-18 14:00:00	164.9471	2.429037	169.2521	3.794222	1159.719	819.8548	903.972	6.849225	4.722719	262.9836	668.8889	161.3693	-0.07132	0.581088	8.738922	1.134684	397.9554	8.588695	14.04606	0	4987.667	273.5328	86.26933
02-Oct-18 14:00:00	02-Oct-18 15:00:00	166.1617	2.481183	187.3813	3.86161	1156.295	819.9694	904.1004	5.156497	4.819777	167.3514	671.8089	163.4035	-0.07623	0.570298	8.733105	1.144211	412.4729	8.588048	13.87979	0	4987.459	273.584	86.35608
02-Oct-18 15:00:00	02-Oct-18 16:00:00	170.6582	2.522118	190.6661	3.832325	1169.063	820.084	903.6544	5.723341	4.563104	378.9193	663.6253	163.2456	-0.06921	0.525689	8.731975	1.144935	418.8617	8.579762	14.27499	0	4988.05	273.6137	86.29038
02-Oct-18 16:00:00	02-Oct-18 17:00:00	173.876	2.524746	236.8831	3.823238	1180.517	820.1654	904.0874	16.58495	4.418599	35.44922	665.8223	165.3822	-0.06486	0.493376	8.759448	1.08018	425.5521	8.500601	14.49829	0	5012.745	275.0679	87.05435
02-Oct-18 17:00:00	02-Oct-18 18:00:00	172.6771	2.524187	245.1981	3.846363	1184.362	820.1659	904.7925	18.27391	5.043002	35.44922	668.9923	162.5046	-0.07103	0.501523	8.673028	1.059836	428.3699	8.486645	13.45303	0	4733.107	258.8429	82.05943
02-Oct-18 18:00:00	02-Oct-18 19:00:00	167.7448	2.523627	164.5442	3.824341	1184.317	820.1628	904.1961	4.017192	5.453867	35.44922	676.0458	155.8668	-0.06898	0.477053	8.640403	1.07758	422.8914	8.486231	12.81593	0	4613.675	251.8714	79.19415
02-Oct-18 19:00:00	02-Oct-18 20:00:00	167.2135	2.523068	179.6406	3.858647	1197.779	820.1596	903.0588	4.131798	4.692449	35.44922	677.1274	155.4845	-0.05522	0.468916	8.692507	1.108012	422.5883	8.462888	13.60333	0	4856.117	265.8818	83.97613
02-Oct-18 20:00:00	02-Oct-18 21:00:00	168.1325	2.522509	202.8745	3.822494	1203.778	820.1564	903.8949	4.508297	4.519662	35.44922	669.8012	157.9132	-0.05466	0.493626	8.71136	1.075298	421.5058	8.254305	14.20289	0	4999.462	274.2271	86.55134
02-Oct-18 21:00:00	02-Oct-18 22:00:00	172.676	2.521949	235.1233	3.860215	1206.526	820.1532	902.2707	4.902453	3.649418	35.44922	697.0241	155.9141	-0.04905	0.49042	8.776495	1.110057	416.4799	8.013808	15.3572	0	5325.611	293.1474	92.25783
02-Oct-18 22:00:00	02-Oct-18 23:00:00	177.3503	2.530172	257.4439	3.864133	1198.629	820.15	903.9346	4.875993	2.975025	35.44922	772.3612	157.6917	-0.0516	0.493668	8.7976	1.10337	413.6382	7.871702	16.25933	0	5510.406	303.9661	96.10581
02-Oct-18 23:00:00	03-Oct-18 00:00:00	172.5415	2.566719	274.3947	3.87586	1160.769	820.1468	903.5281	4.648453	2.882892	47.21756	754.6226	169.3271	-0.0597	0.491797	8.810628	1.087324	419.1792	7.911111	16.75589	0	5511.068	304.0134	96.01285
05-Oct-18 00:00:00	05-Oct-18 01:00:00	153.4364	3.574331	125.3559	3.809981	1092.967	815.6854	902.5537	2.630189	4.923802	83.42316	757.0436	115.979	-0.07257	0.555131	8.721855	1.183863	409.1525	8.597092	14.17363	0	4941.375	275.0394	89.96361
05-Oct-18 01:00:00	05-Oct-18 02:00:00	174.9784	3.705671	152.0465	3.815341	1109.38	815.5591	905.0302	2.335192	4.438837	124.5874	736.4113	118.477	-0.0656	0.516092	8.717316	1.175633	423.1961	8.676343	14.77609	0	5073.606	277.0113	91.74399
05-Oct-18 02:00:00	05-Oct-18 03:00:00	171.7778	3.83701	126.5457	3.739003	1096.312	815.4329	904.3109	3.033787	4.815429	252.2928	732.5627	117.084	-0.07568	0.531337	8.780742	1.123278	406.6948	8.257408	14.39228	0	4796.144	260.0444	85.92271
05-Oct-18 03:00:00	05-Oct-18 04:00:00	164.9559	3.872298	118.4735	3.811136	1090.952	815.3067	903.7085	2.205393	4.924604	136.9626	741.2408	117.4844	-0.06503	0.547192	8.733737	1.132764	400.2082	8.786104	14.08041	0	5026.842	277.515	89.20652
05-Oct-18 04:00:00	05-Oct-18 05:00:00	162.8471	3.774214	97.93763	3.788687	1060.312	815.1805	903.5201	2.694998	4.879736	104.8471	773.5655	115.7163	-0.06556	0.545894	8.758451	1.141504	409.4398	8.498219	14.31998	0	5019.014	278.304	87.91617
05-Oct-18 05:00:00	05-Oct-18 06:00:00	158.0396	3.675264	103.0723	3.79392	1047.307	815.0543	903.7541	2.724346	4.815969	71.93147	777.1333	117.5405	-0.0633	0.547624	8.753497	1.15468	400.2298	8.582698	14.63881	0	5030.911	278.7342	88.31209
05-Oct-18 06:00:00	05-Oct-18 07:00:00	157.2238	3.063747	154.6472	3.827096	1052.746	814.9281	904.4329	20.37319	4.892296	73.44728	777.5533	114.607	-0.06599	0.55302	8.767454	1.12363	409.9801	8.776115	14.45911	0	5069.869	279.9813	90.02003
05-Oct-18 07:00:00	05-Oct-18 08:00:00	190.8442	2.036274	214.4247	3.785331	1081.475	814.8808	903.5263	12.30822	4.326575	81.43961	737.6346	112.9841	-0.06365	0.512887	8.770611	1.10439	400.0687	8.802069	15.51985	0.001591	5071.323	280.0311	89.89697
05-Oct-18 08:00:00	05-Oct-18 09:00:00	148.8621	2.616134	191.4664	3.882262	1079.026	815.7126	905.5038	2.41549	4.409441	216.5319	708.9344	108.6835	-0.06306	0.537806	8.732512	1.166922	411.934	8.689018	13.78409	3.191877	5167.652	286.1657	90.43013
05-Oct-18 09:00:00	05-Oct-18 10:00:00	177.2154	2.820433	181.6466	3.791597	1058.242	816.789	904.323	2.745383	4.635464	79.3071	711.3086	101.1355	-0.07459	0.558557	8.644279	1.202736	401.8291	8.581361	13.19985	3.567219	5403.416	290.9634	90.49351
05-Oct-18 10:00:00	05-Oct-18 11:00:00	190.3214	3.024731	140.838	3.754397	1051.118	817.8655	903.3051	3.136517	4.199026	71.33585	705.575	97.51456	-0.08083	0.561149	8.616385	1.202341	409.6493	8.279338	13.4436	4.002877	5505.786	295.3574	93.18568
05-Oct-18 11:00:00	05-Oct-18 12:00:00	176.2207	3.22903	129.794	3.69512	1045.156	818.6284	903.993	3.41352	4.163169	57.82161	713.7839	98.89051	-0.07233	0.55259	8.497156	1.21662	411.5212	8.075624	13.2939	4.00465	5573.481	299.2079	94.61037
05-Oct-18 12:00:00	05-Oct-18 13:00:00	185.6139	3.760138	161.3585	3.754433	1000.279	818.0053	902.9185	3.303306	4.283867	44.30738	725.7928	89.40023	-0.07461	0.586362	8.65923	0.981732	295.166	8.088301	14.01031	3.149423	5726.049	303.6737	95.76528
05-Oct-18 13:00:00	05-Oct-18 14:00:00	161.2182	3.154857	150.7583	3.849685	962.2811	817.2178	903.745	2.914887	3.768519	69.54567	739.862	116.9482	-0.06654	0.546882	8.670896	1.158166	406.5396	8.253463	14.72026	4.000407	5618.42	297.8742	99.42571
05-Oct-18 14:00:00	05-Oct-18 15:00:00	150.1344	3.139927	164.8228	3.899735	981.469	816.4303	903.9739	2.059046	3.57255	321.1083	735.8679	122.88	-0.06501	0.528728	8.795164	1.18182	400.173	8.139799	11.96516	8.000605	5519.377	295.9455	106.5757
05-Oct-18 15:00:00	05-Oct-18 16:00:00	149.8404	3.11536	166.0209	3.973072	1002.547	816.0247	900.961	2.071891	3.728184	698.1175	934.3652	0.148807	-0.06528	0.544761	8.754031	1.149281	399.4878	7.95214	12.91019	6.953034	5425.669	293.6341	102.19
05-Oct-18 16:00:00	05-Oct-18 17:00:00	173.8073	3.002209	121.1728	3.826684	940.0046	816.5147	902.8537	3.635692	3.91921	73.5365	832.8065	80.65191	-0.0757	0.600105	8.811582	1.15573	406.5445	7.885843	15.63789	0.067001	5512.597	284.2509	105.3209
05-Oct-18 17:00:00	05-Oct-18 18:00:00	165.424	2.871358	138.5122	3.89862	911.6785	816.1112	904.342	4.010272	4.016468	282.1429	863.3553	85.87496	-0.06752	0.579362	8.789204	1.128194	410.9934	7.881353	15.60873	0.007	5124.865	286.7617	102.0718
05-Oct-18 18:00:00	05-Oct-18 19:00:00	188.0006	2.740507	131.1971	3.801864	908.0067	814.1644	903.6645	20.8886	4.271931	66.40773	786.4515	93.02688	-0.07008	0.568846	8.632506	1.176661	397.1422	7.979154	15.49215	0.007	5301.161	312.752	92.25075
05-Oct-18 19:00:00	05-Oct-18 20:00:00	181.9449	2.609656	129.0008	3.740142	887.4845	812.1943	905.1622	12.30948	5.08403	72.99077	725.1341	90.35708	-0.07213	0.577112	8.500366	1.134381	405.5674	8.075279	14.56759	0.007	5007.729	297.0976	85.65141
05-Oct-18 20:00:00	05-Oct-18 21:00:00	161.2351	2.478805	92.5821	3.710789	859.3518	811.0371	903.4461	5.07272	5.709307	79.57381	752.6175	91.48979	-0.06999	0.592429	8.516701	1.098712	398.2839	8.341855	14.19007	0.007	5064.162	297.8984	88.80536
05-Oct-18 21:00:00	05-Oct-18 22:00:00	152.5547	2.347954	139.1213	3.730836	859.5483	811.9047	904.4721	3.203215	5.484337	86.15686	774.0149	92.06987	-0.0578	0.559523	8.613219	1.137615	403.3121	8.747515	14.33949	0.007	5237.53	306.0739	94.06207
05-Oct-18 22:00:00	05-Oct-18 23:00:00	160.1635	2.217104	150.6433	3.842564	862.3833	813.3764	904.6808	2.307301	5.598048	131.3696	808.4071	90.87543	-0.06059	0.541908	8.503135	1.182856	406.791	8.816898	13.60463	0.007	5201.104	308.7074	88.83956
05-Oct-18 23:00:00	06-Oct-18 00:00:00	177.8482	2.148494	155.7122	3.858187	868.9753	816.848	903.9268	2.108163	5.402396	141.1717	797.9532	90.10965	-0.06679	0.545254	8.517845	1.200642	402.7641	8.79606	13.50825	0.007	5258.782	313.3219	88.23487
09-Oct-18 00:00:00	09-Oct-18 01:00:00	223.3327	2.306122	135.2808	3.877776	971.1344	798.0403	902.8194	3.582242	4.181205	64.84375	596.7269	102.5033	-0.06362	0.547176	8.503063	1.10808	408.3482	8.188455	16.77891	0.007	5513.029	328.3182	92.77286
09-Oct-18 01:00:00	09-Oct-18 02:00:00	218.017	1.900258	134.708	3.890224	980.0248	798.5286	904.7126	3.582516	4.436515	64.84375	588.0619	105.4862	-0.06317	0.551261	8.490208	1.115221	410.6788	8.197191	16.3824	0.007	5512.521	328.3808	92.5563
09-Oct-18 02:00:00	09-Oct-18 03:00:00	216.6973	1.494395	136.2349	3.824747	978.2075	798.7383	903.7333	3.580455	4.347128	64.84375	572.8703	106.8911	-0.05992	0.54643	8.473201	1.119947	414.803	8.208946	16.3836	0.007	5512.449	328.3515	92.6006
09-Oct-18 03:00:00	09-Oct-18 04:00:00	213.1992	1.088531	133.6889	3.793474	987.3747	798.8641	904.2717	3.583787	4.107249	64.84375	570.3403	111.198	-0.06096	0.543095	8.504854	1.136215	416.6218	8.207343	16.55938	0.007	5512.678	328.3232	92.73394
09-Oct-18 04:00:00	09-Oct-18 05:00:00	213.139	0.907603	137.2013	3.780745	983.3123	798.99	904.5883	3.241596	4.511334	62.86351	575.8633	114.1178	-0.06293	0.554729	8.499136	1.14761	419.0549	8.169863	15.88521	0.007	5511.767	328.3732	92.58841
09-Oct-18 05:00:00	09-Oct-18 06:00:00	210.2904	1.594391	146.5291	3.750843	983.725	799.1159	903.5883	13.61154	4.355879	54.06375	594.3199	117.166	-0.05916	0.547072	8.479119	1.125895	418.9673	8.211356	16.39325	0.007	5512.484	328.3199	92.72233
09-Oct-18 06:00:00	09-Oct-18 07:00:00	208.1223	2.367285	131.1559	3.738229	993.6573	799.2418	904.058	15.32549	4.309108	44.68984	578.7376	118.802	-0.06221	0.539802	8.449983	1.115342	418.8748	8.179962	16.06858	0.007	5512.013	328.417	92.67213
09-Oct-18 07:00:00	09-Oct-18 08:00:00	138.6961	2.252714	78.85059	3.774088	995.2675	799.3677	904.4009	3.168101	4.435877	35.31592	584.2406	115.7579	-0.06379	0.554041	8.468617	1.132423	419.4397	8.19658	15.77191	0.007	5511.6	328.2762	92.43461
09-Oct-18 08:00:00	09-Oct-18 09:00:00	221.6627	3.977112	134.4077	3.831466	991.7936	799.4936	903.9059	2.908832	4.558561	25.94201	588.7587	99.80292	-0.06467	0.564607	8.420539	1.139733	419.0502	8.201295	15.63694	0.007	5511.437	334.7414	86.55771
09-Oct-18 09:00:00	09-Oct-18 10:00:00	171.2643	4.146967	179.2871	3.800244	1009.398	800.1819	906.6056	2.038012	4.830006	57.478	580.2999	113.1936	-0.06196	0.542812	8.387952	1.16144	413.901	8.323089	13.62131	3.278417	5508.769	336.7991	84.38309
09-Oct-18 10:00:00	09-Oct-18 11:00:00	177.8367	4.092419	201.1211	3.829283	1019.782	807.7064	903.0188	1.796051	4.41801	82.50548	598.8508	113.3982	-0.06278	0.546714	8.371731	1.161028	415.1183	8.246101	13.52127	4.00672	5508.571	336.769	84.32698
09-Oct-18 11:00:00	09-Oct-18 12:00:00	174.285	4.036985	189.2524	3.841082	1014.14	813.1835	903.6888	1.727598	4.244037	89.47225	582.6798	110.4435	-0.06403	0.55636	8.3897	1.183346	397.7833	8.190561	13.73414	4.008449	5556.446	336.7423	84.06232
09-Oct-18 12:00:00	09-Oct-18 13:00:00	176.0755	3.981551	190.5067	3.861963	1003.287	813.5624	904.8257	1.698495	4.509366	102.0997	570.2903	93.45633	-0.06504	0.561914	8.350791	1.170779	404.661	8.188326	13.57735	4.008084	5715.971	336.7997	84.10524
09-Oct-18 13:00:00	09-Oct-18 14:00:00	169.2652	3.926116	196.3763	3.886521	905.6645	813.9151	904.0448	1.972061	4.59296	111.3516	579.2388	101.8067	-0.06618	0.565782	8.354196	1.153193	416.8924	8.246571	13.38736	4.006507	5587.366	333.5466	83.85955
09-Oct-18 14:00:00	09-Oct-18 15:00:00	165.4794	3.870682	238.4863	3.935384	540.1466	814.365	904.2808	1.366805	4.567095	215.8182	590.024	105.1845	-0.06627	0.563861	8.370999	1.151829	419.7204	8.333356	13.15336	4.004074	5705.373	335.8525	84.72111
09-Oct-18 15:00:00	09-Oct-18 16:00:00	172.4983	3.806874	219.2941	4.320701	1128.065	816.6286	903.6532	1.935801	4.444616	92.57493	581.9587	97.48918	-0.06767	0.542557	8.396542	1.155543	419.7931	8.227562	13.21806	4.003025	5730.096	332.6011	88.60244
09-Oct-18 16:00:00	09-Oct-18 17:00:00	176.9918	3.344397	225.0852	3.967902	1119.979	815.8824	904.6199	1.225623	4.514471	252.2327	597.3346	106.7947	-0.06526	0.556851	8.400183	1.112577	419.0088	8.202754	12.99513	4.003806	5627.774	332.5893	88.36926
09-Oct-18 17:00:00	09-Oct-18 18:00:00	159.6519	3.349147	237.3285	3.890946	1110.008	815.414	903.5834	1.070235	4.644365	519.5053	608.1996	105.3391	-0.06261	0.556369	8.407586	1.138077	419.6223	8.211516	12.80781	4.005082	5455.04	329.4265	87.63577
09-Oct-18 18:00:00	09-Oct-18 19:00:00	152.1041	3.454257	199.6437	4.003467	1124.947	815.8825	904.5873	2.002954	4.643538	159.2389	604.2876	95.58576	-0.07026	0.558165	8.442087	1.128418	419.8491	8.200326	12.79068	4.007126	5493.487	331.6843	88.16504
09-Oct-18 19:00:00	09-Oct-18 20:00:00	138.3978	3.559368	219.6751	3.965471	1134.294	816.3518	903.8133	2.16233	4.675675	225.4164	610.0613	93.4566	-0.07677	0.560933	8.446823	1.144133	420.0384	8.102165	12.62339	4.011869	5507.141	332.5941	88.46507
09-Oct-18 20:00:00	09-Oct-18 21:00:00	133.9569	3.664478	216.125	3.96298	1134.746	816.821	904.0561	2.648335	4.468729	138.5195	622.8632	90.31382	-0.07804	0.563773	8.481944	1.168608	420.5308	8.027997	12.65601	4.007663	5507.058	332.6042	88.46444
09-Oct-18 21:00:00	09-Oct-18 22:00:00	133.4152	3.769589	171.4896	3.960965	1107.863	816.8587	903.517	3.335311	4.953201	69.18924	669.5162	85.67355	-0.08737	0.608132	8.539069	1.155682	417.3791	8.003936	14.0419	0.884236	5508.993	332.5335	88.39295
09-Oct-18 22:00:00	09-Oct-18 23:00:00	140.7112	3.837677	161.0765	3.848528	1078.156	814.0105	904.1633	3.191986	5.116179	55.46875	660.8149	98.31868	-0.07826	0.590136	8.511453	1.167732	418.0777	8.224547	14.66981	0	5404.914	326.2988	86.89169
09-Oct-18 23:00:00	10-Oct-18 00:00:00	142.4295	3.827949	172.258	3.860989	1079.064	812.9618	903.8743	2.294057	5.079925	86.82256	622.547	89.85285	-0.0659	0.554848	8.459202	1.126141	416.4854	8.48975	14.70633	0	5226.582	315.3378	83.76476

Alternative fuel trial data
Data run

Start: 9/28/2018 0:00
Finish: 10/16/2018 0:00

Tags

NO	\\bowcntpi\K1_AI2_63_3652.PNT	ppm
NO2	\\bowcntpi\K1_AI5_63_3652.PNT	ppm
SO2	\\bowcntpi\K1_AI1_63_3652.PNT	ppm
Opacity	\\bowcntpi\K1_AI1_63_365.PNT	%
Temperature of gases leaving the kiln	\\bowcntpi\K1_TI1_63_410.PNT	C
Temperature of gases K5 top	\\bowcntpi\K1_TI8_63_210.avg1	C
Temperature of gases leaving the calciner	\\bowcntpi\K1_TI8_63_2203.PNT	C
Residual Oxygen at back end of the kiln	\\bowcntpi\K1_AI3_63_265.PNT	%
Residual Oxygen at calciner down comer duct	\\bowcntpi\K1_AI1_63_203.PNT	%
CO at back end of the kiln?	\\bowcntpi\K1_AI1_63_265.PNT	ppm
CO at calciner down comer duct	\\bowcntpi\K1_AI2_63_203.PNT	ppm
THC (as CH4) in kiln stack gas	\\bowcntpi\K1_AI7_63_3652.PNT	ppm
Kiln negative pressure	\\bowcntpi\K1_PI2_63_410.PNT	kPa
Calciner negative pressure	\\bowcntpi\K1_PI1_63_252.PNT	kPa
Preheater tower negative pressure	\\bowcntpi\K1_PI1_63_210.PNT	kPa
Raw mill negative pressure	\\bowcntpi\RM1_PI2_53_201.PNT	kPa
Raw material feed rate	\\bowcntpi\RM1_PIC_53_201.ME/	t/h
Conventional fuel feed rate - kiln	\\bowcntpi\K1_FI1_63_696.PNT	t/h
Conventional fuel feed rate - calciner	\\bowcntpi\K1_FI1_63_693.PNT	t/h
LCF/Alt fuel feed rate - calciner	\\bowcntpi\K1_FI1_63_935.PNT	t/h
Clinker hourly production rate	\\bowcntpi\K1_FI1_63_410	t/d
Calciner feed	\\bowcntpi\K1_FI1_63_124.PNT	t/h
Kiln feed	\\bowcntpi\K1_FI1_63_125.PNT	t/h

Time stamp		NO	NO2	SO2	Opacity	Temperature of gases leaving the kiln	Temperature of gases K5 top	Temperature of gases leaving the calciner	Residual Oxygen at back end of the kiln	Residual Oxygen at calciner down comer duct	CO at back end of the kiln?	CO at calciner down comer duct	THC (as CH4) in kiln stack gas	egative pre	negative p	ower negat	l negative p	Raw material feed rate	Conventional fuel feed rate - kiln	Conventional fuel feed rate - calciner	LCF/Alt fuel feed rate - calciner	Clinker hourly production rate	alciner fee	Kiln feed
		ppm	ppm	ppm	%	C	C	C	%	%	ppm	ppm	ppm	kPa	kPa	kPa	kPa	t/h	t/h	t/h	t/h	t/d	t/h	t/h
10-Oct-18 00:00:00	10-Oct-18 01:00:00	140.881	3.815742	200.8201	3.95148	1093.731	814.5157	904.6268	1.634032	5.091333	340.4062	623.3342	78.9054	-0.06225	0.534489	8.456229	1.125914	416.8574	8.725519	14.5393	0	5150.306	310.7583	82.66256
10-Oct-18 01:00:00	10-Oct-18 02:00:00	138.8778	3.803535	221.0231	3.925667	1107.808	816.6686	904.2928	1.522204	5.286735	521.9019	638.2863	85.0395	-0.06121	0.526737	8.409536	1.128527	415.8677	8.814606	13.79514	0	5072.532	306.0298	81.25599
10-Oct-18 02:00:00	10-Oct-18 03:00:00	140.0967	3.791328	222.6266	3.945616	1119.385	818.9481	903.9371	1.625642	5.48548	401.7496	634.5893	72.83914	-0.06339	0.541506	8.390316	1.143679	413.1662	8.822771	13.61267	0	5021.195	302.944	80.72242
10-Oct-18 03:00:00	10-Oct-18 04:00:00	146.6967	3.779121	225.8729	3.9655	1122.175	818.7283	903.8547	1.46302	5.867805	565.1596	636.9733	73.99663	-0.0701	0.595187	8.382393	1.074223	410.2349	8.861977	13.75908	0	5074.022	306.104	81.43771
10-Oct-18 04:00:00	10-Oct-18 05:00:00	161.3402	3.766914	218.2194	3.916083	1107.628	818.1186	903.8664	2.141575	5.732798	445.121	628.1419	75.98333	-0.06977	0.593541	8.416624	1.106721	405.7573	8.983764	13.99972	0	5183.311	312.7306	83.15438
10-Oct-18 05:00:00	10-Oct-18 06:00:00	155.6017	3.754706	267.3363	3.986299	1099.708	817.476	904.0648	20.84028	5.783844	57.91016	643.5671	78.95846	-0.06698	0.595296	8.299191	1.063214	413.2538	8.987834	13.97178	0	5188.424	313.0295	83.05103
10-Oct-18 06:00:00	10-Oct-18 07:00:00	173.5692	3.757314	225.0097	3.988508	1084.185	816.8304	903.7112	15.45767	5.690452	77.23812	630.8033	77.17683	-0.06867	0.579367	8.349712	1.072	409.536	8.961702	14.13534	0	5158.771	311.2048	82.76851
10-Oct-18 07:00:00	10-Oct-18 08:00:00	172.5448	3.791062	178.1744	3.872514	1065.301	816.1029	904.0312	1.83104	5.506268	197.0468	618.8498	79.06609	-0.06537	0.562013	8.356904	1.086751	408.6198	8.974616	14.40398	0	5211.51	314.4126	83.50617
10-Oct-18 08:00:00	10-Oct-18 09:00:00	190.5281	3.932137	198.9775	3.931013	1046.009	814.827	904.103	1.249641	5.737493	907.1145	622.0475	78.431	-0.06981	0.557123	8.351788	1.101401	410.5673	8.864816	13.99915	0	5205.763	314.1216	83.59562
10-Oct-18 09:00:00	10-Oct-18 10:00:00	167.9891	4.270725	175.8006	3.886936	1028.685	813.4496	906.3089	1.581339	5.435899	185.8141	617.0499	82.59996	-0.06998	0.562916	8.384415	0.964389	332.062	8.729449	13.61822	2.242822	5210.104	314.4257	83.69263
10-Oct-18 10:00:00	10-Oct-18 11:00:00	158.941	4.20991	224.9981	4.183231	1013.194	811.9316	903.4472	2.076113	5.776021	108.1752	614.577	64.21576	-0.07767	0.609319	8.588983	0.189387	0.276019	8.689331	14.36973	0	5211.022	314.398	83.43793
10-Oct-18 11:00:00	10-Oct-18 12:00:00	154.578	3.88349	213.4143	4.029501	992.061	809.5464	905.2291	1.942521	5.229181	127.2459	608.3586	85.49633	-0.06898	0.564735	8.464442	0.670667	163.1568	8.689678	14.22855	2.192027	5210.875	314.3696	83.57744
10-Oct-18 12:00:00	10-Oct-18 13:00:00	159.2776	3.813694	159.975	3.801476	979.1127	809.681	904.1553	1.55196	4.99803	171.3655	616.5451	124.055	-0.06585	0.539059	8.315732	1.086658	413.6176	8.685497	13.12573	5.480844	5209.154	314.371	83.52144
10-Oct-18 13:00:00	10-Oct-18 14:00:00	156.4306	3.816919	166.0544	3.786601	857.0706	810.648	903.3845	1.635	5.269383	307.2708	658.0277	125.2113	-0.0703	0.547512	8.323273	1.13382	418.6031	8.627557	13.17528	5.02196	5211.674	314.5734	83.54628
10-Oct-18 14:00:00	10-Oct-18 15:00:00	154.2039	3.911725	161.1551	3.843134	1112.457	811.6144	904.1117	1.82236	4.996753	175.2025	647.598	128.2205	-0.07099	0.555084	8.407959	1.127945	419.4368	8.686258	14.54475	0	5347.55	320.4582	87.73979
10-Oct-18 15:00:00	10-Oct-18 16:00:00	162.2503	3.80856	181.573	3.8421	1122.02	812.3416	903.7433	2.023676	5.002539	193.5036	645.8666	127.3814	-0.07438	0.565896	8.39653	1.144662	419.8275	8.6061	14.41524	0	5440.592	326.4446	89.36959
10-Oct-18 16:00:00	10-Oct-18 17:00:00	173.113	3.750601	183.2654	3.778894	1094.721	812.875	903.7601	2.080476	4.93858	190.0123	650.8784	123.7034	-0.07729	0.580036	8.390161	1.171975	419.87	8.581474	14.5182	0	5506.201	332.3266	88.37
10-Oct-18 17:00:00	10-Oct-18 18:00:00	178.161	3.692642	207.7318	3.843454	1033.615	813.4083	904.0379	3.464248	4.884795	119.3824	651.4963	113.852	-0.07542	0.569207	8.421442	1.149512	418.8897	8.534431	14.67627	0	5510.586	332.533	88.26684
10-Oct-18 18:00:00	10-Oct-18 19:00:00	164.7953	3.636498	303.8692	3.968357	1066.522	812.8021	904.0115	20.86425	4.755147	67.39377	651.9105	113.3006	-0.07925	0.57944	8.368979	1.137765	420.2064	8.511095	14.62628	0	5464.746	329.82	87.74642
10-Oct-18 19:00:00	10-Oct-18 20:00:00	167.9069	3.665915	254.9558	3.936431	1129.826	812.2079	903.7997	10.69688	4.846932	142.6527	649.8114	120.7004	-0.07863	0.563539	8.390524	1.140122	419.9242	8.587805	14.74239	0	5496.047	331.654	88.14552
10-Oct-18 20:00:00	10-Oct-18 21:00:00	171.735	3.742191	250.0016	3.993756	1135.822	816.8774	904.1435	2.1302	4.85651	193.5573	631.4212	120.0774	-0.0841	0.579651	8.363586	1.106458	418.0828	8.537024	14.64861	0	5510.504	332.5673	88.43456
10-Oct-18 21:00:00	10-Oct-18 22:00:00	160.1582	3.818466	243.189	4.003317	1134.614	816.3344	904.1936	1.825604	4.835458	353.2697	629.1298	116.0827	-0.08286	0.584499	8.371876	1.11774	419.5147	8.552133	14.63587	0	5510.518	332.5987	88.41608
10-Oct-18 22:00:00	10-Oct-18 23:00:00	163.3329	3.894741	222.1584	3.938191	1128.245	815.7702	903.2784	1.895649	4.723132	485.1893	630.4348	120.5311	-0.07979	0.569472	8.358101	1.113496	418.9065	8.556358	14.84705	0	5510.811	332.5617	88.49321
10-Oct-18 23:00:00	11-Oct-18 00:00:00	161.1136	3.971017	250.887	3.934038	1141.67	815.206	904.4503	1.522859	4.670737	617.1019	627.8218	120.2577	-0.08477	0.55343	8.327131	1.106256	418.9196	8.520988	14.91054	0	5510.873	332.4953	88.49165
11-Oct-18 00:00:00	11-Oct-18 01:00:00	161.8804	4.047292	237.0734	3.835155	1126.639	814.6418	903.6108	2.172637	4.749014	229.6761	605.5566	121.1335	-0.09391	0.590293	8.360115	1.114373	418.5867	8.383949	14.71988	0	5510.442	332.7192	88.42943
11-Oct-18 01:00:00	11-Oct-18 02:00:00	165.0869	4.123568	184.2356	3.790139	1093.188	813.5835	903.7535	2.161412	4.554088	127.7772	581.2966	121.2725	-0.07181	0.557096	8.373251	1.125425	419.1021	8.425123	15.27758	0	5511.279	332.5445	88.36868

Time stamp		NO	NO2	SO2	Opacity	Temperature of gases leaving the kiln	Temperature of gases K5 top	Temperature of gases leaving the calciner	Residual Oxygen at back end of the kiln	Residual Oxygen at calciner down comer duct	CO at back end of the kiln?	CO at calciner down comer duct	THC (as CH4) in kiln stack gas	egative pre	negative p	ower negat	l negative p	Raw material feed rate	Conventional fuel feed rate - kiln	Conventional fuel feed rate - calciner	LCF/Alt fuel feed rate - calciner	Clinker hourly production rate	alciner fee	Kiln feed
		ppm	ppm	ppm	%	C	C	C	%	%	ppm	ppm	ppm	kPa	kPa	kPa	kPa	t/h	t/h	t/h	t/h	t/d	t/h	t/h
11-Oct-18 02:00:00	11-Oct-18 03:00:00	172.2729	4.195968	197.5948	3.811513	1087.082	810.4936	903.7119	1.669523	4.618796	247.4751	569.5712	123.1522	-0.07063	0.549614	8.355439	1.082989	417.35	8.571474	15.35178	0	5511.504	332.6316	88.37663
11-Oct-18 03:00:00	11-Oct-18 04:00:00	168.3097	4.208449	201.1629	3.866625	1088.794	810.2928	904.2282	1.78513	4.727274	315.5974	563.5247	121.6975	-0.07131	0.54894	8.325157	1.087677	415.2107	8.574369	15.28615	0	5510.141	332.4964	88.26395
11-Oct-18 04:00:00	11-Oct-18 05:00:00	168.7809	4.200489	217.8	3.94735	1102.896	810.6607	903.7354	1.998942	4.807274	283.243	558.7271	135.2754	-0.0708	0.551507	8.34753	1.068818	415.0063	8.589427	15.22684	0	5509.823	332.4866	88.44298
11-Oct-18 05:00:00	11-Oct-18 06:00:00	189.0712	4.192529	243.0062	4.184085	1128.956	809.0404	903.9339	20.84416	4.231214	71.9879	574.545	132.8103	-0.07293	0.550368	8.284912	1.047023	412.7699	8.575843	15.49585	0	5511.758	332.5562	88.59727
11-Oct-18 06:00:00	11-Oct-18 07:00:00	193.8736	4.18457	189.2173	4.257027	1115.387	805.5906	904.6393	5.055591	4.164388	107.197	582.3121	135.1914	-0.07008	0.538521	8.287506	1.064768	415.9352	8.530867	15.59751	0	5511.837	332.5676	88.31763
11-Oct-18 07:00:00	11-Oct-18 08:00:00	211.2943	2.732304	231.0318	4.359379	1094.02	805.5856	903.7363	1.833038	4.470412	124.8523	598.8795	135.3331	-0.07232	0.547858	8.283364	1.035802	413.8033	8.578687	15.33735	0	5511.348	332.5685	88.30664
11-Oct-18 08:00:00	11-Oct-18 09:00:00	176.0839	3.934582	194.4405	4.283752	1079.474	805.5806	904.2793	1.838972	4.719204	115.9656	598.9745	134.5283	-0.07267	0.546448	8.300681	1.073045	414.1914	8.591399	15.09375	0	5462.239	329.6456	87.66384
11-Oct-18 09:00:00	11-Oct-18 10:00:00	189.7663	4.456513	280.5898	4.619838	1071.499	805.5756	903.5813	2.092702	4.987142	186.4055	583.4982	77.64851	-0.07531	0.58145	8.677963	0.472545	56.17245	8.592636	15.30281	0	5501.418	331.97	88.25617
11-Oct-18 10:00:00	11-Oct-18 11:00:00	187.9308	4.807346	296.4535	4.504006	1066.73	805.5707	903.3874	2.3715	4.515307	109.5651	578.5306	68.28783	-0.07695	0.576336	8.828836	0.248623	0.157956	8.548747	16.13186	0	5512.642	332.5823	88.51825
11-Oct-18 11:00:00	11-Oct-18 12:00:00	209.2717	5.154136	263.9947	4.387625	1067.989	805.5657	904.655	2.72287	4.523771	94.95474	606.2755	64.42582	-0.07968	0.577942	8.827186	0.219242	0.157956	8.497099	15.90584	0	5512.277	332.6329	88.42881
11-Oct-18 12:00:00	11-Oct-18 13:00:00	212.9399	5.288946	314.4317	4.268897	1066.505	806.7958	904.4523	1.803702	4.978447	160.9097	596.1946	44.74269	-0.08038	0.590188	8.811406	0.38461	61.14514	8.479265	15.40968	0	5511.497	332.525	88.54222
11-Oct-18 13:00:00	11-Oct-18 14:00:00	189.207	3.700226	224.8517	3.829589	1065.477	811.4822	903.4541	1.60091	4.778419	305.0538	616.9049	124.8784	-0.07321	0.56407	8.372915	1.092622	417.0472	8.400848	15.11999	0	5511.029	332.5375	88.44766
11-Oct-18 14:00:00	11-Oct-18 15:00:00	200.6443	3.681614	156.2338	3.801545	1050.628	807.4847	904.3835	2.28124	4.535385	104.3694	622.1712	120.3529	-0.07146	0.554129	8.361651	1.147297	418.6813	8.394431	15.33416	0	5511.333	332.6492	88.3976
11-Oct-18 15:00:00	11-Oct-18 16:00:00	199.7467	3.663002	179.9541	3.861644	1035.297	804.1966	903.7457	2.440071	4.674973	99.02981	625.6488	124.5388	-0.07046	0.546366	8.349313	1.099992	418.9319	8.589892	15.29299	0.189779	5511.162	332.4874	88.4781
11-Oct-18 16:00:00	11-Oct-18 17:00:00	192.9102	3.644391	180.6689	3.790875	1023.05	804.1744	906.4688	2.579695	4.347572	93.84593	670.4194	128.6215	-0.06198	0.518691	8.366638	1.050648	405.4629	8.599715	15.30037	2.061902	5511.553	332.6265	88.44594
11-Oct-18 17:00:00	11-Oct-18 18:00:00	201.6954	3.625779	184.4905	3.831376	1018.237	804.1523	903.7351	3.643822	4.356919	96.28139	607.5933	125.1476	-0.06313	0.527367	8.345033	1.042753	407.688	8.581713	14.67608	3.795389	5510.6	332.5674	88.44406
11-Oct-18 18:00:00	11-Oct-18 19:00:00	186.8933	3.607168	202.7554	3.848579	1009.135	804.2221	903.8667	17.64806	4.33199	98.74432	586.4077	121.2318	-0.06197	0.525733	8.313119	1.060305	408.5961	8.587316	14.91247	3.744875	5509.51	332.4881	88.19084
11-Oct-18 19:00:00	11-Oct-18 20:00:00	185.4032	3.588556	182.3057	3.788716	998.7765	804.8343	903.9771	3.241297	4.308309	104.0965	589.2966	118.0916	-0.06309	0.519898	8.407539	1.093755	414.5641	8.601302	15.19513	3.474565	5511.357	332.6133	88.41829
11-Oct-18 20:00:00	11-Oct-18 21:00:00	179.8493	3.569867	189.6267	3.845217	989.6196	805.5353	904.2425	2.286648	4.26852	141.3815	596.4471	120.8066	-0.06301	0.524943	8.396525	1.099871	419.2107	8.793515	16.11795	1.187171	5512.83	332.594	88.44317
11-Oct-18 21:00:00	11-Oct-18 22:00:00	186.4713	3.542012	204.7829	3.788209	986.3036	806.1235	906.2237	2.124531	4.524698	253.5447	584.9119	126.1621	-0.06517	0.532796	8.396155	1.095556	417.3851	8.855549	15.28179	2.517355	5511.866	332.5987	88.5853
11-Oct-18 22:00:00	11-Oct-18 23:00:00	175.8194	3.507865	160.3249	3.812786	980.7941	806.3065	904.287	2.712894	4.645682	113.4847	580.5874	119.2042	-0.06105	0.523776	8.378427	1.126154	417.8922	8.675604	15.49622	2.212886	5435.058	327.9089	86.88481
11-Oct-18 23:00:00	12-Oct-18 00:00:00	185.9774	3.473719	166.5339	3.829148	972.8861	806.4531	904.0583	2.571696	4.223855	80.74513	585.7336	120.1508	-0.05894	0.509778	8.372389	1.129381	415.8974	8.691076	15.51713	3.771546	5511.52	332.554	88.42846
12-Oct-18 00:00:00	12-Oct-18 01:00:00	178.6217	3.439572	177.7701	3.820737	967.1955	806.5997	904.99	2.342294	4.479897	87.57894	605.6396	122.7817	-0.05875	0.516225	8.364478	1.097235	413.1926	8.701546	15.29836	2.421138	5514.158	332.756	88.55588
12-Oct-18 01:00:00	12-Oct-18 02:00:00	161.2593	3.405425	176.6212	3.776057	955.7562	806.7463	904.8908	2.228663	5.123012	143.3324	654.9367	122.5347	-0.06003	0.531284	8.312312	1.076048	413.5847	9.002514	15.63162	0	5278.654	318.4607	84.81368
12-Oct-18 02:00:00	12-Oct-18 03:00:00	169.7656	3.371279	156.9674	3.796866	941.3989	806.8929	903.6471	2.110134	5.364665	176.1226	659.3217	124.0207	-0.06094	0.546647	8.323612	1.063719	412.9695	9.11042	15.42038	0	5268.481	317.7408	84.35711
12-Oct-18 03:00:00	12-Oct-18 04:00:00	172.888	3.337132	151.7874	3.777111	928.2817	807.0396	903.8919	1.911025	5.256785	166.8933	630.4075	126.784	-0.05504	0.540296	8.30501	1.081682	411.1387	9.208538	15.74394	0	5307.437	320.115	84.97671
12-Oct-18 04:00:00	12-Oct-18 05:00:00	178.7495	3.294109	186.9535	3.853907	920.197	807.1849	903.9124	1.386782	4.949925	562.3963	646.9963	127.7219	-0.05013	0.522559	8.36415	1.107197	412.4802	9.264089	15.87397	0	5465.794	329.6438	87.63264
12-Oct-18 05:00:00	12-Oct-18 06:00:00	157.2753	2.975117	203.5219	3.778513	914.3519	806.0918	904.004	13.8441	4.918311	121.0796	687.662	124.8946	-0.0519	0.546245	8.372173	1.109825	410.076	9.056719	15.89128	0	5397.069	325.6365	86.71861
12-Oct-18 06:00:00	12-Oct-18 07:00:00	142.2313	2.525326	211.7023	3.784734	906.7948	796.8295	903.8301	16.14775	5.452254	83.35768	640.2683	123.5624	-0.05857	0.544051	8.271805	1.12072	410.3474	9.19633	15.5999	0	5145.742	310.2946	82.4857
12-Oct-18 07:00:00	12-Oct-18 08:00:00	195.794	2.030848	211.3037	3.798039	898.9908	805.5677	903.5566	2.421754	5.015298	127.3931	679.3698	128.8445	-0.05635	0.541823	8.3504	1.114955	411.1459	9.188584	16.15021	0	5374.328	324.0405	86.02098
12-Oct-18 08:00:00	12-Oct-18 09:00:00	146.4001	2.501651	187.5509	3.838488	896.2366	809.8708	904.7577	2.221317	4.541622	157.38	652.7539	122.4503	-0.03454	0.508382	8.421027	1.152181	408.6947	9.183523	16.05529	1.466935	5512.117	332.5173	88.56247
12-Oct-18 09:00:00	12-Oct-18 10:00:00	175.9458	2.552943	209.168	3.719403	899.7772	811.5657	904.8726	2.006925	4.331833	185.4703	607.7899	114.8266	-0.05175	0.500996	8.396508	1.159522	410.957	9.164753	14.94131	5.255259	5511.762	332.5766	88.41823
12-Oct-18 10:00:00	12-Oct-18 11:00:00	170.8814	2.604235	180.9687	3.689868	902.5472	812.7723	903.8643	2.426981	4.657299	123.8608	656.469	118.1176	-0.03563	0.511655	8.397305	1.137761	411.0401	8.865173	14.5583	5.078921	5510.902	332.5682	88.42027
12-Oct-18 11:00:00	12-Oct-18 12:00:00	165.8573	2.655528	169.6724	3.688631	899.5969	811.303	903.8521	2.765706	4.530975	129.7479	669.0275	121.7563	-0.04794	0.497796	8.387873	1.137689	413.2303	8.772753	14.78729	4.661415	5511.076	332.5915	88.35705
12-Oct-18 12:00:00	12-Oct-18 13:00:00	167.007	2.70682	225.0947	3.79493	897.016	811.3918	903.6558	1.807685	4.453636	241.9967	650.1271	135.6545	-0.05851	0.515395	8.42507	1.151152	412.3845	9.100113	14.90576	4.658903	5511.559	332.5759	88.49135
12-Oct-18 13:00:00	12-Oct-18 14:00:00	171.2085	2.758112	265.0684	3.814196	899.5636	814.6865	905.4361	1.471261	4.637037	636.7946	614.9759	154.4457	-0.05897	0.491934	8.411451	1.149249	415.4586	9.085583	14.20036	5.024327	5510.683	332.5744	88.40692
12-Oct-18 14:00:00	12-Oct-18 15:00:00	167.2702	2.809404	269.3838	3.887971	905.7677	818.0221	903.6139	1.752746	4.905924	763.1515	610.0934	167.4674	-0.06433	0.525849	8.432446	1.168833	415.9899	8.888144	13.80429	4.268221	5509.896	332.6091	88.3862
12-Oct-18 15:00:00	12-Oct-18 16:00:00	164.1423	2.853621	270.3315	3.885537	907.9974	819.7519	905.0386	1.857229	5.132368	884.86	588.964	181.5362	-0.05835	0.492117	8.405801	1.162271	416.9214	8.928173	13.3713	4.431246	5635.422	328.6307	87.50188
12-Oct-18 16:00:00	12-Oct-18 17:00:00	156.0961	2.872603	254.3168	3.95672	908.4107	820.1692	903.2769	1.387976	5.108542	1408.312	605.8123	177.1787	-0.05532	0.49954	8.40832	1.146987	413.4166	8.959307	13.27423	4.412425	5270.573	316.5422	84.39991
12-Oct-18 17:00:00	12-Oct-18 18:00:00	152.8562	2.889347	254.7682	3.96589	909.2705	820.5865	904.2758	1.495746	5.028185	1208.509	604.6414	182.9028	-0.05648	0.49748	8.36195	1.170702	408.1064	8.89926	13.58581	4.212226	5229.714	315.601	83.77052
12-Oct-18 18:00:00	12-Oct-18 19:00:00	152.4194	2.90609	309.4539	3.971388	908.5128	821.0038	904.2998	1.864994	5.397378	603.9504	581.8475	179.6372	-0.0585	0.517662	8.346227	1.123866	410.0195	8.892748	13.09274	3.467962	5223.401	315.2578	83.89302
12-Oct-18 19:00:00	12-Oct-18 20:00:00	157.1634	2.922833	229.4857	3.900676	905.1855	821.4211	905.0056	1.878869	6.087749	1077.088	602.1864	175.2289	-0.05525	0.518828	8.347353	1.106756	411.8547	8.774471	13.44666	0.657247	5126.172	306.2043	85.35946
12-Oct-18 20:00:00	12-Oct-18 21:00:00	171.0929	2.939577	202.0165	3.863627	897.8622	818.5745	904.3248	2.340352	6.188138	110.262	616.8712	174.5313	-0.05705	0.524572	8.40526	1.15614	414.948	8.378495	13.33992	0	4913.556	287.9076	87.48067
12-Oct-18 21:00:00	12-Oct-18 22:00:00	179.4415	2.95632	182.3832	3.772142	886.4981	814.2043	904.12	1.907176	6.41485	113.0601	627.4666	184.4343	-0.05513	0.527001	8.378508	1.166473	419.1043	8.401413	13.16049	0	4842.941	284.822	85.07162
12-Oct-18 22:00:00	12-Oct-18 23:00:00	181.1378	2.973064	211.8904	3.776807	872.5147	813.3232	903.7227	1.757821	6.371449	112.0045	613.6119	186.5049	-0.05302	0.513817	8.382486	1.142307	419.7213	8.486338	13.47289	0	4806.112	280.9342	85.81484
12-Oct-18 23:00:00	13-Oct-18 00:00:00	187.5664	2.979258	212.2422	3.817022	861.5487	812.1652	903.951	2.013398	6.328039	82.79824	616.363	184.7003	-0.05317	0.513818	8.434703	1.150376	418.9696	8.654112	13.51284	0	4831.918	281.6549	87.37354

Alternative fuel trial data
Data run

Start:	12/2/2018 0:00	12/2/2018 0:00
Finish:	12/10/2018 0:00	12/10/2018 0:00

Tags

NO	\\bowcntpi\K1_AI2_63_3652.PNT	ppm
NO2	\\bowcntpi\K1_AI5_63_3652.PNT	ppm
SO2	\\bowcntpi\K1_AI1_63_3652.PNT	ppm
Opacity	\\bowcntpi\K1_AI1_63_365.PNT	%
Temperature of gases leaving the kiln	\\bowcntpi\K1_TI1_63_410.PNT	C
Temperature of gases K5 top	\\bowcntpi\K1_TI8_63_210.avg1	C
Temperature of gases leaving the calciner	\\bowcntpi\K1_TI8_63_2203.PNT	C
Residual Oxygen at back end of the kiln	\\bowcntpi\K1_AI3_63_265.PNT	%
Residual Oxygen at calciner down comer duct	\\bowcntpi\K1_AI1_63_203.PNT	%
CO at back end of the kiln?	\\bowcntpi\K1_AI1_63_265.PNT	ppm
CO at calciner down comer duct	\\bowcntpi\K1_AI2_63_203.PNT	ppm
THC (as CH4) in kiln stack gas	\\bowcntpi\K1_AI7_63_3652.PNT	ppm
Kiln negative pressure	\\bowcntpi\K1_PI2_63_410.PNT	kPa
Calciner negative pressure	\\bowcntpi\K1_PI1_63_252.PNT	kPa
Preheater tower negative pressure	\\bowcntpi\K1_PI1_63_210.PNT	kPa
Raw mill negative pressure	\\bowcntpi\RM1_PI2_53_201.PNT	kPa
Raw material feed rate	\\bowcntpi\RM1_PIC_53_201.MEAS	t/h
Conventional fuel feed rate - kiln	\\bowcntpi\K1_FI1_63_696.PNT	t/h
Conventional fuel feed rate - calciner	\\bowcntpi\K1_FI1_63_693.PNT	t/h
LCF/Alt fuel feed rate - calciner	\\bowcntpi\K1_FI1_63_935.PNT	t/h
Clinker hourly production rate	\\bowcntpi\K1_FI1_63_410	t/d
Calciner feed	\\bowcntpi\K1_FI1_63_124.PNT	t/h
Kiln feed	\\bowcntpi\K1_FI1_63_125.PNT	t/h

		NO	NO2	SO2	Opacity	Temperature of gases leaving the kiln	Temperature of gases K5 top	Temperature of gases leaving the calciner	Residual Oxygen at back end of the kiln	Residual Oxygen at calciner down comer duct	CO at back end of the kiln?	CO at calciner down comer duct	THC (as CH4) in kiln stack gas	Kiln negative pressure	Calciner negative pressure	Preheater tower negative pressure	Raw mill negative pressure	Raw material feed rate	Conventional fuel feed rate - kiln	Conventional fuel feed rate - calciner	LCF/Alt fuel feed rate - calciner	Clinker hourly production rate	Calciner feed	Kiln feed
		ppm	ppm	ppm	%	C	C	C	%	%	ppm	ppm	ppm	kPa	kPa	kPa	kPa	t/h	t/h	t/h	t/h	t/d	t/h	t/h
02-Dec-18 00:00:00	02-Dec-18 01:00:00	258.7504	3.764959116	218.1831	2.666478	373.4928	798.9573	898.9475	4.307749	4.446644	351.5456	383.3927	239.9426	-0.06516	0.490465	7.377475	1.011937	410.4489	9.384161	17.91692	0	5212.471	277.4723	92.47209
02-Dec-18 01:00:00	02-Dec-18 02:00:00	258.9723	3.625427703	221.5674	2.874089	372.8961	799.0951	897.9572	4.998293	4.476182	361.9279	387.9954	246.0615	-0.06559	0.501043	7.424033	0.992026	412.5472	9.468005	17.78103	0	5212.433	277.4834	92.46445
02-Dec-18 02:00:00	02-Dec-18 03:00:00	253.5007	3.440803616	219.9782	3.018517	371.3584	799.1147	897.9967	5.023889	4.105918	355.1013	397.7677	219.9196	-0.06354	0.494858	7.429012	0.992606	412.985	9.661792	17.99202	0	5213.036	277.5748	92.54361
02-Dec-18 03:00:00	02-Dec-18 04:00:00	235.1394	3.269226955	219.6195	3.07996	370.0358	799.1343	897.0368	4.626265	4.031262	341.5091	414.645	207.7318	-0.06386	0.498504	7.474882	0.988278	414.8644	9.81904	18.22139	0	5203.304	276.9124	92.28519
02-Dec-18 04:00:00	02-Dec-18 05:00:00	216.4451	3.087815206	230.7613	3.14103	369.4908	800.7156	898.8572	3.135566	4.05165	357.0106	398.7628	202.5825	-0.05973	0.500167	7.670863	0.980183	419.2285	10.25427	18.09839	0	5213.696	277.51	92.59707
02-Dec-18 05:00:00	02-Dec-18 06:00:00	190.1552	2.849692815	336.3372	3.202099	368.0472	806.0366	899.0861	1.217221	4.787835	1513.097	402.318	171.1963	-0.06204	0.51165	7.719712	0.966522	418.9237	9.950271	16.91645	0	5211.016	277.3836	92.46667
02-Dec-18 06:00:00	02-Dec-18 07:00:00	168.8638	13.25580483	215.2124	3.263169	368.5095	813.7636	897.8223	2.23237	4.908339	565.3674	388.8766	163.1392	-0.06477	0.510086	7.809029	0.961695	418.1771	9.384745	16.80893	0	5210.945	277.5147	92.66165
02-Dec-18 07:00:00	02-Dec-18 08:00:00	207.8668	3.16046056	364.7433	3.455856	367.8401	811.5445	898.3135	1.45948	5.095625	1273.86	398.1682	175.8488	-0.06367	0.52157	7.780984	0.97366	418.9601	9.359732	16.65005	0	5210.65	277.5129	92.65582
02-Dec-18 08:00:00	02-Dec-18 09:00:00	216.9686	3.369322912	345.7014	3.598242	367.2009	816.3019	897.9869	4.973325	5.00656	503.9212	412.8081	220.0961	-0.06446	0.511839	7.784203	0.98731	419.81	8.986004	16.54806	0	5209.97	277.5399	92.51053
02-Dec-18 09:00:00	02-Dec-18 10:00:00	210.1406	3.131797331	331.3845	3.677641	366.646	814.853	897.0321	4.468885	4.933837	435.0064	421.8023	199.392	-0.06725	0.520586	7.801396	0.930175	330.1453	8.922196	16.95285	0	5210.469	277.4882	92.39598
02-Dec-18 10:00:00	02-Dec-18 11:00:00	212.8645	2.638935691	247.5713	3.567888	365.0048	811.2631	898.3598	12.59777	4.780943	390.5411	415.1359	191.9464	-0.06858	0.514749	7.632719	1.053812	412.3761	8.760671	17.06699	0	5210.315	277.4876	92.79796
02-Dec-18 11:00:00	02-Dec-18 12:00:00	197.4848	2.724224291	282.4059	3.43363	364.7391	804.9039	898.2301	6.746403	4.92375	376.1533	418.479	145.3629	-0.06805	0.514257	7.749776	1.069682	408.9999	9.510507	16.7496	0	5197.821	276.7341	92.26796
02-Dec-18 12:00:00	02-Dec-18 13:00:00	212.1981	2.809512891	274.1425	3.297766	363.0705	811.6701	897.3545	1.737903	4.616865	501.8715	408.1053	141.8274	-0.06516	0.507369	7.72984	1.045343	412.9722	9.558002	17.40003	0	5141.673	284.0713	94.5619
02-Dec-18 13:00:00	02-Dec-18 14:00:00	208.4186	2.890428304	206.0513	3.151048	362.8715	812.7351	896.6024	2.844097	4.03171	417.4921	411.0186	153.6405	-0.06519	0.509612	7.769936	1.011559	418.6607	8.995836	18.16669	0	5200.548	290.25	96.793
02-Dec-18 14:00:00	02-Dec-18 15:00:00	231.8983	2.890009091	212.5321	3.002302	360.4882	809.7411	898.2026	3.174167	3.551745	399.5718	408.101	200.7339	-0.06213	0.484055	7.58934	1.000081	420.815	8.682707	18.78049	0	5200.974	290.2236	96.51913
02-Dec-18 15:00:00	02-Dec-18 16:00:00	241.0052	2.858939025	171.7332	2.86896	359.0382	806.002	897.7364	3.284577	3.354351	401.6159	416.7725	206.8602	-0.06012	0.494946	7.3183	0.976006	421.3726	8.679734	19.00531	0	5201.21	290.2754	96.88838
02-Dec-18 16:00:00	02-Dec-18 17:00:00	229.7295	2.82786896	199.7559	2.773023	357.2168	804.027	898.9725	3.507315	3.48192	425.7267	418.9348	208.7336	-0.05861	0.490757	7.342068	0.975181	420.6749	8.688668	18.8453	0	5261.344	286.0049	95.18512
02-Dec-18 17:00:00	02-Dec-18 18:00:00	200.0152	2.797042709	239.6362	2.678762	355.5243	802.1772	897.8975	3.815321	3.876874	420.7485	415.3493	207.241	-0.06159	0.491822	7.284884	0.971855	418.2719	8.747041	18.1504	0	5211.537	277.5044	92.90439
02-Dec-18 18:00:00	02-Dec-18 19:00:00	181.0735	2.78515625	188.9154	2.61518	353.6066	801.2144	897.6308	3.272632	3.489308	415.7702	435.6856	178.3781	-0.06002	0.488511	7.235414	0.998635	419.0192	8.733091	18.55594	0	5189.76	286.2783	95.15048
02-Dec-18 19:00:00	02-Dec-18 20:00:00	197.4331	2.78515625	194.7206	2.713999	351.3591	801.8462	897.9125	3.044921	3.679	410.792	425.0007	207.1104	-0.06108	0.501167	7.29935	1.010387	421.7826	8.686852	18.49825	0	5200.343	290.2339	96.87907
02-Dec-18 20:00:00	02-Dec-18 21:00:00	225.015	2.784587782	109.862	3.058081	349.8347	800.9209	897.9344	4.996503	3.45602	405.8138	421.2041	153.3591	-0.06584	0.487224	7.341472	1.0457	424.5244	8.787806	18.65521	0	5200.728	290.277	96.76623
02-Dec-18 21:00:00	02-Dec-18 22:00:00	235.6202	3.40902397	152.4616	3.193804	346.85	796.8326	897.6802	4.470897	3.600637	400.8355	427.8275	152.5901	-0.06502	0.499411	7.31251	0.940247	346.4678	9.068134	18.66574	0	5201.153	290.2103	96.94761
02-Dec-18 22:00:00	02-Dec-18 23:00:00	209.2844	3.320126401	269.2422	2.947681	343.1729	801.1096	898.5463	2.527009	3.489225	454.9204	460.4239	120.8342	-0.0673	0.509117	7.397964	0.843508	281.928	8.926464	18.89349	0	5197.339	290.036	96.59818
02-Dec-18 23:00:00	03-Dec-18 00:00:00	234.5892	2.636381949	293.7653	2.935362	339.7459	812.5082	898.7841	2.019667	4.380714	1006.807	437.9999	189.6715	-0.07295	0.509358	7.891597	1.011222	425.1072	9.040369	17.55819	0	5124.038	285.936	95.32123
03-Dec-18 00:00:00	03-Dec-18 01:00:00	244.3764	2.855415039	188.9556	2.973091	335.8794	809.0711	897.9886	20.0403	4.09649	422.6947	426.2521	204.4397	-0.07783	0.517074	7.942569	0.985452	424.5465	9.021607	17.59898	0	5185.037	289.4336	96.3125
03-Dec-18 01:00:00	03-Dec-18 02:00:00	232.8118	2.986733973	145.6598	3.007401	321.388	802.926	897.9442	14.38897	3.966493	436.8423	417.7818	203.5141	-0.07783	0.506621	7.965557	0.948428	408.4157	9.51854	17.94247	0	5200.555	290.2204	96.80014
03-Dec-18 02:00:00	03-Dec-18 03:00:00	205.7878	3.118052907	157.4478	3.139914	274.7678	805.3824	897.194	3.331597	3.938492	609.839	420.631	171.7825	-0.07149	0.503333	7.947316	0.990083	410.7061	10.11418	18.00041	0	5201.615	290.2318	96.71572
03-Dec-18 03:00:00	03-Dec-18 04:00:00	183.3611	8.370637131	189.6528	3.226588	274.5606	807.3956	899.7788	1.652307	4.466203	1069.469	424.0137	165.1707	-0.07826	0.51759	7.931555	1.03314	418.6064	10.25287	17.13009	0	5200.746	290.334	96.86263

		NO	NO2	SO2	Opacity	Temperature of gases leaving the kiln	Temperature of gases K5 top	Temperature of gases leaving the calciner	Residual Oxygen at back end of the kiln	Residual Oxygen at calciner down comer duct	CO at back end of the kiln?	CO at calciner down comer duct	THC (as CH4) in kiln stack gas	Kiln negative pressure	Calciner negative pressure	Preheater tower negative pressure	Raw mill negative pressure	Raw material feed rate	Conventional fuel feed rate - kiln	Conventional fuel feed rate - calciner	LCF/Alt fuel feed rate - calciner	Clinker hourly production rate	Calciner feed	Kiln feed
03-Dec-18 04:00:00	03-Dec-18 05:00:00	227.9478	2.945824703	179.4552	3.227166	273.0015	811.3058	897.462	2.438596	4.737814	492.9855	421.8937	194.9883	-0.08524	0.522582	7.89565	1.016449	418.0519	10.05712	16.83733	0	5200.133	290.2536	96.64629
03-Dec-18 05:00:00	03-Dec-18 06:00:00	275.3241	2.545018225	187.662	3.227744	264.6787	807.7236	897.7542	3.874311	4.506631	480.5744	416.9213	189.6567	-0.08335	0.51856	7.918345	1.00403	417.4757	10.05424	17.31794	0	5200.727	290.2047	96.667
03-Dec-18 06:00:00	03-Dec-18 07:00:00	147.896	13.37039176	212.1598	3.229756	256.0856	806.7027	898.3931	1.624947	4.808743	2026.491	423.5435	147.7056	-0.07339	0.497915	7.869693	1.015648	419.6857	10.24646	17.03954	0	5188.31	289.5683	96.66008
03-Dec-18 07:00:00	03-Dec-18 08:00:00	261.1331	3.678561051	193.659	3.215013	253.9383	811.8453	897.931	3.399197	4.637199	716.2703	423.2328	151.6433	-0.08134	0.521693	7.62816	1.020215	419.8652	9.681431	17.33036	0	5200.304	290.2376	96.7731
03-Dec-18 08:00:00	03-Dec-18 09:00:00	189.1509	8.76144639	108.5903	3.03089	256.5566	806.8845	897.0272	13.81957	4.134136	450.3132	409.1029	187.6952	-0.06694	0.509807	7.505829	0.978837	412.0269	9.074135	18.09563	0	5200.504	290.1977	96.62427
03-Dec-18 09:00:00	03-Dec-18 10:00:00	195.8558	3.142578838	154.6654	2.912413	260.1654	795.6907	898.1348	9.252881	3.994607	1054.799	411.1854	184.1071	-0.06423	0.495788	7.492104	1.00086	414.6933	9.124281	18.60329	0	5219.696	282.4166	94.06866
03-Dec-18 10:00:00	03-Dec-18 11:00:00	183.4952	3.150277287	178.7353	2.793935	259.7899	796.42	898.2345	5.817055	4.601659	59.86318	410.1804	180.9076	-0.06472	0.508588	7.463343	1.000193	413.3446	9.368458	17.93136	0	5211.426	277.4666	92.64201
03-Dec-18 11:00:00	03-Dec-18 12:00:00	199.7991	3.157975736	198.3232	2.675766	259.2279	800.5116	898.4441	3.287133	4.831769	78.85613	414.3421	135.62	-0.0673	0.520754	7.51255	1.005397	415.1663	9.383603	17.60577	0	5211.885	277.4868	92.72187
03-Dec-18 12:00:00	03-Dec-18 13:00:00	228.8148	3.167209535	247.911	2.624978	264.5026	805.8928	898.7204	2.361968	5.003117	131.2806	415.4559	154.0949	-0.0664	0.527285	7.59332	1.024107	419.0545	9.344383	17.20931	0	5211.313	277.5439	92.2721
03-Dec-18 13:00:00	03-Dec-18 14:00:00	211.6086	3.17821654	190.9228	2.625388	267.1321	808.1381	897.4547	3.287251	5.116475	135.1543	419.045	192.0627	-0.06951	0.531732	7.554078	1.02271	420.9983	9.21763	17.0943	0	5210.982	277.5349	92.40185
03-Dec-18 14:00:00	03-Dec-18 15:00:00	198.2147	3.189225804	171.6651	2.625798	270.0965	805.8054	897.4205	3.633919	4.860338	95.28681	413.6653	194.3409	-0.06695	0.524549	7.517405	1.028054	420.7913	9.30803	17.39643	0	5211.585	277.4861	92.60688
03-Dec-18 15:00:00	03-Dec-18 16:00:00	181.6744	3.200235068	176.7002	2.626209	270.2492	803.1648	898.1832	3.498016	4.638624	112.3979	402.153	201.6334	-0.06419	0.51484	7.285426	1.000114	419.44	9.629551	17.8621	0	5212.714	277.5455	92.31503
03-Dec-18 16:00:00	03-Dec-18 17:00:00	195.6609	3.211244332	235.6629	2.626619	272.7435	802.7471	897.9938	2.233979	4.943025	170.5133	391.1267	156.0611	-0.06424	0.529626	7.314586	1.011455	422.3555	9.967009	17.35904	0	5212.097	277.5061	92.53631
03-Dec-18 17:00:00	03-Dec-18 18:00:00	217.9154	3.222253596	257.2012	2.62703	275.9648	808.2876	898.6844	2.16395	5.16675	189.3789	395.7412	173.8001	-0.06532	0.522734	7.494868	1.053894	424.3939	9.870501	16.83807	0	5211.54	277.5115	92.25262
03-Dec-18 18:00:00	03-Dec-18 19:00:00	227.5666	3.233253956	241.4462	2.62744	280.3527	808.5333	898.38	2.666795	5.163171	137.1464	388.5292	165.0471	-0.06485	0.501432	7.530213	1.022021	423.1674	9.798636	16.46716	0	5218.448	277.9239	92.64392
03-Dec-18 19:00:00	03-Dec-18 20:00:00	216.8027	3.239304291	256.7185	2.627775	284.276	808.4154	897.4224	2.010834	4.828384	182.3091	404.9457	176.2906	-0.05938	0.49882	7.667893	1.040419	424.7403	9.942159	16.75897	0	5376.02	286.899	95.81289
03-Dec-18 20:00:00	03-Dec-18 21:00:00	219.4354	3.241184304	273.5141	2.620353	285.8795	808.6597	897.934	2.343934	4.967233	156.3847	409.4873	163.0425	-0.06598	0.506459	7.902101	1.060611	423.6293	9.984356	16.82619	0	5404.316	288.6021	96.06556
03-Dec-18 21:00:00	03-Dec-18 22:00:00	114.0851	2.524176464	234.4411	2.607747	288.5912	808.9039	897.6903	2.621931	4.897017	147.5175	421.3333	190.3419	-0.06911	0.513516	7.995396	1.025366	420.7275	9.943701	16.86977	0	5406.779	288.7329	96.09515
03-Dec-18 22:00:00	03-Dec-18 23:00:00	207.5728	2.731034733	212.4929	2.595141	289.7951	809.148	898.2674	2.464123	4.885679	160.5094	426.3416	174.7069	-0.06816	0.520319	7.985018	1.047928	421.0573	9.943245	17.22524	0	5407.474	288.7266	96.32083
03-Dec-18 23:00:00	04-Dec-18 00:00:00	219.5144	3.281649853	211.139	2.582535	291.4081	809.1528	897.9597	2.515471	4.949219	227.6795	428.8005	171.6182	-0.0674	0.519369	7.971192	1.050462	423.7248	9.794697	17.42677	0	5407.578	288.7223	96.10844
04-Dec-18 00:00:00	04-Dec-18 01:00:00	207.5201	3.465029741	198.3507	2.569929	294.4491	808.9436	897.3248	2.840305	4.8712	138.1221	425.7262	193.6942	-0.06343	0.531274	8.009029	1.013676	421.1947	9.806984	17.41086	0	5407.537	288.7744	96.3469
04-Dec-18 01:00:00	04-Dec-18 02:00:00	188.9986	3.397074732	218.2277	2.557323	294.7222	808.7345	898.0142	2.816311	4.819622	148.1533	417.0271	189.3572	-0.06139	0.531257	8.041288	1.038148	422.494	9.897998	17.56547	0	5407.762	288.7461	96.19393
04-Dec-18 02:00:00	04-Dec-18 03:00:00	179.0078	3.329119723	241.3851	2.544717	296.6242	808.5253	898.196	2.588514	4.64384	147.4888	421.7384	175.3537	-0.05933	0.526452	8.037349	1.049694	424.562	9.75941	17.73506	0	5407.767	288.5359	96.359
04-Dec-18 03:00:00	04-Dec-18 04:00:00	186.2776	3.261164714	242.1937	2.532218	298.0814	808.3482	898.3522	2.940933	4.727295	144.5404	424.7517	172.3319	-0.06159	0.535461	8.042826	1.042695	423.2698	9.79593	17.68575	0	5407.72	288.7436	96.14256
04-Dec-18 04:00:00	04-Dec-18 05:00:00	186.8507	3.193209706	245.6364	2.527415	296.2381	809.7281	898.2427	2.764727	4.848786	300.4511	420.5961	148.2035	-0.06102	0.523738	8.055578	1.030601	423.3223	9.97647	17.50232	0	5407.856	288.77	96.31739
04-Dec-18 05:00:00	04-Dec-18 06:00:00	208.6157	3.125077691	343.9688	2.527348	296.8439	815.9614	898.0732	1.448903	5.187616	1420.319	424.7383	39.17912	-0.06129	0.525975	7.986771	1.034835	423.3248	9.788368	16.95485	0	5407.992	288.7301	96.46939
04-Dec-18 06:00:00	04-Dec-18 07:00:00	154.4102	13.14003141	273.1543	2.527282	297.8773	820.7584	898.0976	19.11467	4.987661	130.6512	432.935	0	-0.0632	0.526869	7.994752	1.076758	421.0573	9.487459	16.95106	0	5408.127	288.7231	96.25668
04-Dec-18 07:00:00	04-Dec-18 08:00:00	201.8405	2.610490964	264.029	2.529566	297.0673	815.7441	897.9262	4.213469	4.944372	225.3436	434.2336	0	-0.06422	0.509856	8.015054	1.054719	421.2266	9.46027	17.28893	0.000159	5408.263	288.8105	96.25542
04-Dec-18 08:00:00	04-Dec-18 09:00:00	175.5024	2.596927596	215.3878	2.63113	296.1454	813.4389	896.7564	3.657945	4.844614	171.1561	425.6615	0	-0.06296	0.523793	7.975118	1.027693	418.8627	9.537432	17.4459	0	5407.758	288.8243	96.34338
04-Dec-18 09:00:00	04-Dec-18 10:00:00	167.1444	2.583364228	193.4541	2.619239	296	809.3494	898.3561	3.532643	4.69751	143.2617	424.3022	0	-0.06554	0.521608	7.787467	1.025258	416.9919	9.605882	17.88357	0.008114	5407.829	288.7262	96.18351
04-Dec-18 10:00:00	04-Dec-18 11:00:00	153.5832	2.56980086	340.4847	2.606451	295.981	808.6515	896.9905	2.113709	4.708421	1070.032	431.0526	0	-0.05473	0.534062	7.758708	1.06119	413.8636	9.740468	18.9222	0	5379.133	287.0714	95.96577
04-Dec-18 11:00:00	04-Dec-18 12:00:00	169.9204	2.556237492	350.993	2.593663	294.3864	821.0426	900.1386	2.208969	5.15258	270.5624	430.7958	2.958984	-0.06981	0.517359	7.928462	1.081951	410.8167	9.603976	16.96887	0	5338.29	284.7973	94.67766
04-Dec-18 12:00:00	04-Dec-18 13:00:00	157.6324	2.542674124	258.7739	2.580875	291.7874	819.2227	901.5817	2.457349	4.652347	243.5325	446.502	69.26899	-0.07145	0.493945	7.981572	1.060064	403.6204	9.481454	15.46494	3.404796	5404.379	288.672	96.17399
04-Dec-18 13:00:00	04-Dec-18 14:00:00	132.9682	2.529110755	222.9297	2.568087	289.4277	818.6671	899.1864	3.060886	3.969022	134.7135	455.4387	189.8632	-0.06198	0.474219	7.896391	1.034873	404.224	9.430765	11.51694	11.94353	5398.954	288.8006	96.46469
04-Dec-18 14:00:00	04-Dec-18 15:00:00	162.4084	2.525025336	141.8542	2.555299	286.4264	815.1123	895.8985	3.990891	4.835791	181.667	449.6202	132.8122	-0.05982	0.476193	7.763234	1.05678	402.5545	9.294493	15.70595	2.65498	5402.763	288.6505	96.18835
04-Dec-18 15:00:00	04-Dec-18 16:00:00	133.6651	2.553611609	219.3965	2.542572	281.4969	811.0284	898.9284	3.768863	4.551517	254.6661	461.7437	[-11059] N	-0.06045	0.511624	7.656379	1.07444	403.911	9.384705	16.19639	2.288822	5401.138	288.5107	95.97927
04-Dec-18 16:00:00	04-Dec-18 17:00:00	126.1648	2.584952643	199.5356	2.537364	279.5381	810.5482	900.1094	3.321245	3.614444	200.2908	443.6959	[-11059] N	-0.0546	0.488116	7.572825	1.029636	408.5112	9.339044	11.42681	11.92815	5398.686	288.7771	96.13329
04-Dec-18 17:00:00	04-Dec-18 18:00:00	141.0119	2.616293677	200.781	2.537364	278.9946	810.4028	898.9371	3.080763	4.038981	195.9034	424.0659	[-11059] N	-0.05937	0.506777	7.444853	1.045183	405.7416	9.389956	10.84001	11.9478	5398.001	288.6999	96.13147
04-Dec-18 18:00:00	04-Dec-18 19:00:00	131.2949	2.647634712	235.9618	2.537364	278.41	811.8738	898.1984	2.793634	4.394776	209.0523	415.0272	[-11059] N	-0.06018	0.507889	7.383591	1.077458	398.9833	9.388047	10.22824	11.9334	5397.1	288.7792	96.26347
04-Dec-18 19:00:00	04-Dec-18 20:00:00	187.3137	2.678975746	278.8267	2.537364	280.9703	813.5272	894.4797	2.613623	4.833648	222.2586	420.4237	[-11059] N	-0.05918	0.517686	7.376235	1.07055	404.7735	9.390829	12.33143	6.754087	5411.09	289.414	96.57156
04-Dec-18 20:00:00	04-Dec-18 21:00:00	166.8377	2.71031678	314.8768	2.537364	281.878	811.6984	897.5903	2.450572	4.704427	310.5076	420.0638	[-11059] N	-0.05408	0.520452	7.403769	1.042402	416.5255	9.597379	14.21958	4.003617	5415.217	289.5065	96.1785
04-Dec-18 21:00:00	04-Dec-18 22:00:00	169.2288	2.741657815	337.3328	2.537364	281.0112	810.5943	895.6541	14.40728	4.891292	236.3854	423.2657	[-11059] N	-0.05227	0.501005	7.577196	1.023795	417.3774	9.832077	15.96908	1.41932	5418.574	289.4703	96.28829
04-Dec-18 22:00:00	04-Dec-18 23:00:00	174.7492	2.760111673	289.1495	2.537364	283.0386	809.1433	898.0138	17.76463	4.917494	192.1774	421.8279	[-11059] N	-0.05126	0.444368	7.778422	1.001598	415.7331	10.11658	17.37931	0.002	5419.209	289.4086	96.62494
04-Dec-18 23:00:00	05-Dec-18 00:00:00	184.4724	2.745448804	254.175	2.537363	293.1634	811.6138	898.0445	3.245223	4.754625	228.7937	416.8774	[-11059] N	-0.05105	0.444571	7.822444	0.999248	413.6214	9.876121	17.67047	0.002	5420.963	289.5283	96.4898
05-Dec-18 00:00:00	05-Dec-18 01:00:00	200.7607	2.729115476	244.4295	2.537264	297.6692	812.518	898.2572	3.422847	5.017128	166.7498	422.9556	[-11059] N	-0.05693	0.462059	7.78041	1.028295	412.6369	9.796203	16.87459	0.002	5419.696	289.5346	96.37309
05-Dec-18 01:00:00	05-Dec-18 02:00:00	191.2878	2.712782149	241.5212	2.537095	301.8087	812.7908	897.7773	3.434165	5.009581	173.1082	429.057	[-11059] N	-0.05185	0.453679	7.814053	1.044727	402.7029	9.748913	16.88948	0.002	5419.698	289.4351	96.42778
05-Dec-18 02:00:00	05-Dec-18 03:00:00	191.4697	2.696448821	259.7129	2.536927	306.6342	813.0637	897.7638	3.033919	4.92873	205.7659	425.3465	[-11059] N	-0.05066	0.454457	7.83433	1.036752	403.979	9.86726	17.48395	0.002	5420.726	289.5358	96.19015
05-Dec-18 03:00:00	05-Dec-18 04:00:00	185.6393	2.680115494	255.3564	2.536759	310.1088	813.0316	898.0206	3.090213	4.976052	198.3487	435.6476	[-11059] N	-0.04827	0.452449	7.823379	1.045762	407.1066	9.80254	17.22659	0.002	5420.111	289.4865	96.58863
05-Dec-18 04:00:00	05-Dec-18 05:00:00	178.6345	2.663782166	212.6714	2.536591	312.3812	811.6847	897.563	3.548025	4.711069	148.5674	433.0598	[-11059] N	-0.04457	0.458757	7.523282	1.048915	407.1028	9.652203	17.6101	0.002	5420.548	289.5152	96.44955
05-Dec-18 05:00:00	05-Dec-18 06:00:00	181.0593	2.647448839	232.0734	2.536423	311.2961	809.2884	898.2821	3.054606	4.722718	142.5026	449.8253	[-11059] N	-0.04441	0.466009	7.566955	1.034746	406.0924	9.805522	17.58243	0.002	5420.797	289.4626	96.45798
05-Dec-18 06:00:00	05-Dec-18 07:00:00	142.6358	13.35713889	184.7332	2.536255	311.6185	809.6376	898.0037	10.95889	4.644871	155.7415	449.752	[-11059] N	-0.04526	0.477788	7.601053	1.044647	403.8145	9.599013	17.68529	0.002	5420.633	289.4582	96.29978
05-Dec-18 07:00:00	05-Dec-18 08:00:00	175.1588	2.942556513	236.592	2.536088	312.0919	807.2792	898.3864	14.44366	4.539228	168.9804	443.2729	[-11059] N	-0.04541	0.480123	7.501822	1.035267	401.8681	9.403148	17.57398	0.123323	5420.131	289.5439	96.69058
05-Dec-18 08:00:00	05-Dec-18 09:00:00	160.6022	2.701496546	203.2666	2.643321	312.5654	805.8412	899.4938	3.490817	4.368896	627.6781	445.9869	[-11059] N	-0.04445	0.491043	7.48448	1.019785	402.3439	9.050443	16.9393	1.753458	5418.804	289.5118	96.30846
05-Dec-18 09:00:00	05-Dec-18 10:00:00	151.6887	2.658907786	226.6495	2.470819	314.1209	808.0036	900.1735	2.259116	3.427371	175.2034	483.3271	[-11059] N	-0.03952	0.480998	7.562399	1.002924	404.9622	9.767167	11.94275	11.64144	5412.98	289.4757	96.59264
05-Dec-18 10:00:00	05-Dec-18 11:00:00	168.3038	2.644542121	172.6842	2.489763	320.1604	812.3082	897.7953	2.527921	4.12867	190.1643	492.2967	[-11059] N	-0.04623	0.497397	7.553726	1.013925	404.8728	9.704981	11.35798	10.0675	5410.842	289.408	96.49316
05-Dec-18 11:00:00	05-Dec-18 12:00:00	149.5462	2.630176456	145.6447	2.505087	325.9571	811.6738	898.5769	3.076139	3.909415	189.402	476.4066	[-11059] N	-0.0636	0.52131	7.515979	1.077162	404.9078	9.389306	10.72485	11.96603	5410.884	289.569	96.45503
05-Dec-18 12:00:00	05-Dec-18 13:00:00	152.3861	2.61581079	189.189	2.522222	332.1001	810.7561	897.3772	2.917987	3.947736	191.6296	475.8539	[-11059] N	-0.06015	0.514319	7.447301	1.097898	408.5919	9.477702	10.73345	11.97198	5410.923	289.5144	96.43142
05-Dec-18 13:00:00	05-Dec-18 14:00:00	159.8043	2.601445125	209.8047	2.539356	337.1451	811.6427	897.7404	2.593359	3.787615	201.3705	493.0011	145.3739	-0.05405	0.47782	7.433584	1.112477	409.2567	9.674556	11.14442	11.15474	5411.356	289.5251	96.55202
05-Dec-18 14:00:00	05-Dec-18 15:00:00	176.303	2.58707946	316.022	2.55649	340.2846	814.5478	895.0938	1.672777	4.806641	232.6586	517.7227	36.43823	-0.06946	0.518006	7.62268	1.110855	412.4664	9.697312	13.94198	2.823888	5411.602	289.2666	96.65429

		NO	NO2	SO2	Opacity	Temperature of gases leaving the kiln	Temperature of gases K5 top	Temperature of gases leaving the calciner	Residual Oxygen at back end of the kiln	Residual Oxygen at calciner down comer duct	CO at back end of the kiln?	CO at calciner down comer duct	THC (as CH4) in kiln stack gas	Kiln negative pressure	Calciner negative pressure	Preheater tower negative pressure	Raw mill negative pressure	Raw material feed rate	Conventional fuel feed rate - kiln	Conventional fuel feed rate - calciner	LCF/Alt fuel feed rate - calciner	Clinker hourly production rate	Calciner feed	Kiln feed
05-Dec-18 15:00:00	05-Dec-18 16:00:00	177.0893	2.572713795	315.624	2.573625	343.8726	817.5042	897.0611	1.742909	4.890483	295.5866	525.0721	0.644127	-0.07225	0.530132	7.837504	1.11278	413.5648	9.716417	15.54646	0.292602	5361.907	286.2634	95.35788
05-Dec-18 16:00:00	05-Dec-18 17:00:00	168.0001	2.550710787	295.6664	2.590656	345.5186	816.9873	897.8236	2.47973	4.922253	225.3764	531.7655	0.460087	-0.07104	0.549381	7.842401	1.110704	413.042	9.710327	15.68327	0.017461	5330.956	284.484	94.73004
05-Dec-18 17:00:00	05-Dec-18 18:00:00	175.5411	2.502685105	315.3721	2.590471	347.8779	816.2779	898.1994	14.30647	4.838484	226.8703	538.1246	0.371347	-0.07509	0.599032	7.794876	1.099158	412.0191	9.70911	15.9071	0.016185	5409.461	289.0186	96.52728
05-Dec-18 18:00:00	05-Dec-18 19:00:00	153.8945	2.452503854	357.9824	2.577723	349.1904	816.127	898.6121	19.27872	4.70708	240.5436	554.2794	0.339869	-0.06743	0.575824	7.679985	1.08496	412.965	9.695402	15.78969	0.014908	5331.352	284.522	94.74002
05-Dec-18 19:00:00	05-Dec-18 20:00:00	153.319	2.402322603	319.1606	2.564976	351.4954	820.0472	897.4347	2.413479	4.661179	263.0886	526.6408	0.247757	-0.06903	0.58186	7.69787	1.10936	415.3001	9.683501	15.80567	0.013632	5371.585	286.8084	95.94183
05-Dec-18 20:00:00	05-Dec-18 21:00:00	148.0741	2.352141352	365.2309	2.552228	354.061	821.6807	898.0156	2.018695	4.563022	325.4641	526.1944	0.084353	-0.07115	0.600669	7.827447	1.109869	417.7768	9.63932	15.71422	0.012356	5399.878	288.4402	95.87429
05-Dec-18 21:00:00	05-Dec-18 22:00:00	159.1369	2.301960101	295.9504	2.539481	356.2537	821.1551	897.8304	2.96682	4.277929	214.906	499.8267	0.138697	-0.0686	0.583231	7.858067	1.112	418.9878	9.391462	16.42675	0.01108	5417.795	289.443	96.84711
05-Dec-18 22:00:00	05-Dec-18 23:00:00	158.8798	2.251778851	302.3926	2.526733	357.8762	818.0936	897.0634	3.126383	4.258028	217.8879	499.0208	0.297422	-0.06382	0.58882	7.855899	1.100837	420.4636	9.393677	16.49152	0.009804	5418.51	289.5253	96.26906
05-Dec-18 23:00:00	06-Dec-18 00:00:00	166.8353	2.2015976	252.7436	2.513986	357.9108	816.4695	898.3979	3.433099	4.054211	220.8698	496.2018	0.399411	-0.05929	0.600259	7.800197	1.105164	409.8758	9.390043	16.81671	0.009011	5419.071	289.4532	96.34228
06-Dec-18 00:00:00	06-Dec-18 01:00:00	169.7798	2.176285117	264.835	2.501436	356.9253	814.3474	897.3031	3.325555	3.968561	223.8517	496.0099	0.225376	-0.05867	0.564279	7.77403	1.121315	411.8005	9.416551	16.97789	0.009	5419.294	289.5312	96.61095
06-Dec-18 01:00:00	06-Dec-18 02:00:00	182.7234	2.229728099	290.2053	2.497179	358.1364	815.3963	899.2545	3.04534	4.378697	226.8332	510.7283	0.05019	-0.063	0.588733	7.774988	1.112238	417.8184	9.392704	16.30173	0.009	5418.379	289.5017	96.44414
06-Dec-18 02:00:00	06-Dec-18 03:00:00	179.7146	2.288980205	270.3833	2.497296	356.171	815.795	898.12	2.941782	4.619997	213.277	523.6501	0	-0.07191	0.634593	7.876547	1.111421	417.9281	9.39206	15.91292	0.009	5417.879	289.4998	96.34231
06-Dec-18 03:00:00	06-Dec-18 04:00:00	186.6799	2.348232312	259.544	2.497414	353.6044	815.5232	897.6825	3.329648	4.418241	209.8866	509.8661	0	-0.06365	0.580276	7.834205	1.115391	413.72	9.389397	16.36767	0.009	5418.528	289.4879	96.34271
06-Dec-18 04:00:00	06-Dec-18 05:00:00	191.7966	2.407484419	263.8387	2.497532	349.4904	815.2513	898.2	3.085515	4.382897	209.9736	513.1655	0	-0.06176	0.560118	7.812486	1.108268	410.4972	9.389534	16.21365	0.009	5418.356	289.5119	96.64742
06-Dec-18 05:00:00	06-Dec-18 06:00:00	181.3652	2.466736526	298.8617	2.49765	343.9709	814.1264	897.3567	18.11671	4.272536	210.0606	516.7936	0	-0.06181	0.584615	7.722942	1.110618	408.8729	9.406781	16.45335	0.009	5418.652	289.4898	96.06793
06-Dec-18 06:00:00	06-Dec-18 07:00:00	129.4136	13.11826181	230.6533	2.497767	340.4153	810.6393	897.5621	12.16828	4.074966	210.1476	538.1913	0	-0.05306	0.558204	7.78161	1.109595	409.268	9.701709	17.13333	0.009	5419.785	289.4854	96.61291
06-Dec-18 07:00:00	06-Dec-18 08:00:00	192.6073	2.624553798	291.9177	2.494172	337.0992	818.4706	897.8756	9.289461	4.294004	210.2346	514.0328	28.06459	-0.0612	0.573026	7.797091	1.106286	411.042	9.44333	16.80505	0.009	5419.227	289.5467	96.38925
06-Dec-18 08:00:00	06-Dec-18 09:00:00	180.3493	2.520389269	196.6177	2.451196	333.7245	815.9319	899.6708	4.173162	3.573435	177.8198	562.2336	115.112	-0.05025	0.508067	7.612248	1.110078	396.3191	9.384045	17.56463	1.232249	5420.23	289.4494	96.4208
06-Dec-18 09:00:00	06-Dec-18 10:00:00	129.0778	2.41622474	230.873	2.407974	331.0471	814.158	893.4282	2.141486	3.686382	1648.377	939.2299	147.9619	-0.04491	0.516678	7.578887	1.111202	394.6347	9.410527	13.97675	6.219364	5392.035	288.2276	96.09959
06-Dec-18 10:00:00	06-Dec-18 11:00:00	112.2783	2.31206021	231.5305	2.427423	327.5618	823.2922	890.8777	2.164008	3.745801	1690.283	951.3986	147.0377	-0.0493	0.627214	7.8018	1.165007	400.6709	9.310186	15.7283	2.342675	5316.819	283.7624	95.17292
06-Dec-18 11:00:00	06-Dec-18 12:00:00	123.2524	2.207895681	150.6526	2.457423	328.4913	821.2104	900.4251	4.16003	3.030487	54.15588	913.6804	135.7762	-0.03948	0.588224	7.586496	1.143282	413.6276	8.720944	10.93455	8.537555	4994.351	264.1496	89.50137
06-Dec-18 12:00:00	06-Dec-18 13:00:00	151.8283	2.103731152	222.3821	2.486969	329.9913	819.5914	899.707	2.585289	2.891786	79.28604	1141.867	142.088	-0.04699	0.652877	7.827205	1.139456	408.3809	9.38596	9.845839	11.69798	5371.152	285.3806	97.54226
06-Dec-18 13:00:00	06-Dec-18 14:00:00	142.9918	2.038224683	178.2312	2.497904	331.4913	819.9567	889.4533	2.788062	3.990884	550.6605	790.7702	133.381	-0.05218	0.626419	7.885923	1.147478	396.9907	9.390518	15.16141	3.681435	5405.451	284.9787	99.88666
06-Dec-18 14:00:00	06-Dec-18 15:00:00	175.361	2.051325394	184.066	2.499093	332.9693	818.767	898.4866	3.407682	3.795555	99.25831	567.1542	99.86449	-0.03335	0.595964	7.856676	1.138168	408.7485	9.390788	18.05031	0.009	5420.945	285.6387	100.4857
06-Dec-18 15:00:00	06-Dec-18 16:00:00	168.3859	2.066718667	191.6999	2.500283	334.3129	816.944	898.1937	3.485586	4.155193	65.04165	519.1241	120.5904	-0.03165	0.583204	7.84113	1.101258	411.3204	9.395541	17.63332	0.024331	5420.403	285.6503	100.274
06-Dec-18 16:00:00	06-Dec-18 17:00:00	140.7827	2.082111941	270.6824	2.501472	335.1238	817.8806	900.6696	2.484363	3.773135	138.1087	819.2238	125.4781	-0.04903	0.597942	7.807277	1.102796	411.8623	9.397933	12.79258	6.629339	5415.801	285.7473	100.3478
06-Dec-18 17:00:00	06-Dec-18 18:00:00	151.0627	2.097505214	188.5786	2.502662	336.1012	820.1124	894.9764	3.364171	3.67627	103.8241	699.3111	128.263	-0.04775	0.550037	7.823865	1.137102	408.3712	9.388129	14.11093	5.221265	5412.351	285.4425	100.3435
06-Dec-18 18:00:00	06-Dec-18 19:00:00	151.8179	2.112898487	204.6894	2.503851	336.0033	817.1104	899.4381	7.014457	3.442113	65.82031	791.8876	126.7347	-0.05006	0.565865	7.864833	1.152215	414.2792	9.384936	12.07621	7.861518	5412.676	285.6875	100.2647
06-Dec-18 19:00:00	06-Dec-18 20:00:00	178.7129	2.12829176	266.7668	2.505041	336.0032	812.2583	897.0229	13.31654	4.135546	65.82031	507.6435	129.8743	-0.05527	0.575925	7.483923	1.113725	418.5425	9.721185	13.84808	4.431233	5292.942	278.6335	97.89425
06-Dec-18 20:00:00	06-Dec-18 21:00:00	157.9068	2.143685034	232.7829	2.506198	334.769	812.6459	897.875	3.393507	4.828444	65.82031	477.2904	127.415	-0.06615	0.589039	7.641617	1.11028	419.0741	9.86057	15.66678	1.834031	5396.881	284.4075	99.68801
06-Dec-18 21:00:00	06-Dec-18 22:00:00	164.5818	2.173992258	247.0483	2.506496	334.4047	814.4647	896.0742	3.659822	4.710991	65.82031	474.7327	128.4927	-0.06567	0.551705	7.737929	1.107888	418.0972	9.720076	14.99227	3.943112	5417.15	285.6529	100.3282
06-Dec-18 22:00:00	06-Dec-18 23:00:00	159.1263	2.223256772	215.8808	2.506414	332.5107	816.0242	899.0531	3.75129	4.795124	65.82031	485.2327	18.33395	-0.07151	0.578876	7.775892	1.137926	410.5621	9.694621	16.98251	0	5419.827	285.661	100.1931
06-Dec-18 23:00:00	07-Dec-18 00:00:00	161.4401	2.27258757	213.7645	2.506332	328.5318	814.8576	898.0727	4.068695	4.899633	65.82031	469.0878	0.835888	-0.06621	0.567613	7.781602	1.116511	407.7056	9.804952	17.16135	0	5420.262	285.6192	100.2231
07-Dec-18 00:00:00	07-Dec-18 01:00:00	156.8129	2.321918368	173.1332	2.506251	325.83	812.0999	897.6192	4.859836	4.824301	65.82031	475.1756	0.851118	-0.07006	0.570974	7.710229	1.145576	416.5227	9.642835	17.29867	0	5420.242	285.6511	100.5319
07-Dec-18 01:00:00	07-Dec-18 02:00:00	161.2238	2.371249165	168.8292	2.506169	323.9193	808.1625	897.7441	4.579258	4.680113	68.02846	486.0968	0.975156	-0.05746	0.552927	7.533808	1.150193	420.0436	9.585508	17.68051	0	5420.739	285.6503	100.2957
07-Dec-18 02:00:00	07-Dec-18 03:00:00	158.0735	2.420579963	200.4904	2.506087	323.4041	808.1468	898.5616	3.8136	4.69213	73.16054	484.6391	0.938469	-0.05705	0.545658	7.437481	1.138107	421.2206	9.709745	17.68685	0	5420.812	285.6396	100.2446
07-Dec-18 03:00:00	07-Dec-18 04:00:00	165.3879	2.469910761	212.1163	2.506005	321.8872	809.193	897.568	3.635395	4.90478	78.30657	476.1481	1.119481	-0.05793	0.523338	7.476582	1.118903	412.6244	9.870021	17.41068	0	5420.687	285.6498	100.3533
07-Dec-18 04:00:00	07-Dec-18 05:00:00	156.3244	2.519388231	181.769	2.505941	320.1511	809.5203	897.3634	4.470635	4.605145	83.45259	469.4977	1.230195	-0.05944	0.522769	7.488467	1.060629	403.0065	9.681396	18.153	0	5421.441	285.6699	100.2476
07-Dec-18 05:00:00	07-Dec-18 06:00:00	150.1856	2.616273309	174.6325	2.506124	320.1494	805.2797	897.6646	9.782265	4.082682	88.59862	454.1386	1.268466	-0.05034	0.512562	7.362357	1.135523	405.6086	9.691733	18.93381	0	5422.525	285.6562	100.3247
07-Dec-18 06:00:00	07-Dec-18 07:00:00	134.4788	13.20768805	147.6319	2.506386	319.9823	804.3571	898.4062	16.1016	4.190323	93.74464	452.8089	1.371447	-0.0513	0.511038	7.333798	1.152894	417.9462	9.818041	18.76243	0	5422.453	285.6287	100.3085
07-Dec-18 07:00:00	07-Dec-18 08:00:00	168.6385	2.685264836	183.643	2.506647	318.6615	804.8207	898.0457	4.482136	4.697057	98.89066	442.5331	2.961933	-0.0556	0.518733	7.334444	1.137364	422.4726	9.711555	18.18919	0	5421.547	285.6934	100.4887
07-Dec-18 08:00:00	07-Dec-18 09:00:00	159.0054	2.663160166	151.2201	2.506909	316.1583	804.6759	897.3398	4.67833	4.141213	104.0414	486.856	35.96551	-0.04124	0.483863	7.402662	1.120467	416.9142	9.771084	18.93314	0	5422.11	285.5919	100.1944
07-Dec-18 09:00:00	07-Dec-18 10:00:00	159.9942	2.641055495	95.53112	2.50717	315.0037	804.4904	898.3545	4.616114	4.428874	114.0822	451.0363	79.63777	-0.04325	0.505933	7.392559	1.111571	409.893	9.811134	18.76206	0	5422.522	285.6507	100.5851
07-Dec-18 10:00:00	07-Dec-18 11:00:00	155.8152	2.618950825	97.70517	2.492993	314.4386	804.3049	897.4496	4.714746	3.958719	128.4389	466.5775	152.6287	-0.04062	0.489461	7.423191	1.142768	400.7132	9.742799	19.35336	0	5422.847	285.6674	100.5003
07-Dec-18 11:00:00	07-Dec-18 12:00:00	161.9036	2.596846155	89.6567	2.314951	314.794	804.1194	897.9953	4.787035	3.995329	147.1377	471.8587	160.5024	-0.04483	0.502349	7.429551	1.124423	407.9853	9.746729	19.24087	0	5423.084	285.566	100.1879
07-Dec-18 12:00:00	07-Dec-18 13:00:00	159.764	2.574741485	112.8619	2.596127	314.9533	803.999	897.6999	3.698726	4.187735	146.0878	477.1612	162.414	-0.04513	0.515993	7.46013	1.117729	409.7158	10.237	19.28213	0	5423.713	285.6976	100.4277
07-Dec-18 13:00:00	07-Dec-18 14:00:00	160.9176	2.552636814	120.3689	2.418333	316.2775	806.909	899.1704	3.878329	4.605553	156.3326	470.7751	165.4053	-0.05213	0.543255	7.461056	1.117198	412.7714	10.10083	18.25689	0	5422.189	285.6674	100.1908
07-Dec-18 14:00:00	07-Dec-18 15:00:00	163.2596	2.54069055	99.56067	2.419741	315.4175	807.7285	898.1077	4.25585	4.441566	166.5773	475.9354	167.5861	-0.04697	0.522597	7.444686	1.120104	409.5098	9.882655	18.44847	0	5422.079	285.6424	100.1724
07-Dec-18 15:00:00	07-Dec-18 16:00:00	157.8956	2.567508301	129.2334	2.432561	316.6309	807.2906	898.2126	3.532031	4.470035	176.8221	471.0235	158.6367	-0.04606	0.535289	7.509818	1.121118	413.7023	10.18042	18.50906	0	5422.6	285.6104	100.5098
07-Dec-18 16:00:00	07-Dec-18 17:00:00	159.9274	2.598115149	140.9225	2.445382	316.6705	807.6376	898.3131	3.355252	4.80879	187.0669	469.4951	160.7902	-0.04985	0.514583	7.472659	1.104865	413.0489	10.15346	18.05978	0	5421.576	285.6424	100.4697
07-Dec-18 17:00:00	07-Dec-18 18:00:00	158.1604	2.628721997	147.3884	2.458202	317.33	808.6137	897.8635	3.278441	4.86216	197.3116	466.0653	[-11059] N	-0.05219	0.513605	7.515456	1.111285	412.9178	10.17719	17.86726	0	5421.656	285.5964	100.4098
07-Dec-18 18:00:00	07-Dec-18 19:00:00	203.4992	2.659328845	185.6019	2.471022	318.0189	809.5899	897.846	13.93914	4.867727	207.5564	462.0863	[-11059] N	-0.05911	0.517073	7.515153	1.120155	405.8884	10.13984	17.96252	0	5421.774	285.6578	100.382
07-Dec-18 19:00:00	07-Dec-18 20:00:00	207.677	2.689935693	187.0158	2.483842	319.2255	805.6967	898.1486	11.60812	4.627878	217.5427	466.7938	[-11059] N	-0.05341	0.51687	7.478928	1.115972	408.6977	10.03626	18.26918	0	5422.035	285.6081	100.1069
07-Dec-18 20:00:00	07-Dec-18 21:00:00	214.5021	2.720542541	152.2175	2.496662	320.7215	804.5465	897.183	4.625383	4.661155	224.6112	452.1501	[-11059] N	-0.04856	0.503873	7.458568	1.110519	403.913	9.59714	18.37294	0	5421.569	285.6476	100.2961
07-Dec-18 21:00:00	07-Dec-18 22:00:00	202.4934	2.751149389	155.9816	2.504464	321.3396	805.5046	898.1477	4.094461	4.304519	230.8607	454.7732	[-11059] N	-0.04412	0.497615	7.461714	1.12959	399.9373	9.791609	18.73313	0	5422.351	285.6472	100.5345
07-Dec-18 22:00:00	07-Dec-18 23:00:00	206.0306	2.793215445	172.5439	2.504563	320.7507	806.4633	897.7708	3.514475	4.449823	237.1103	468.8643	[-11059] N	-0.04357	0.494773	7.481669	1.131704	413.4716	9.870065	18.35726	0	5421.931	285.6827	100.3218
07-Dec-18 23:00:00	08-Dec-18 00:00:00	227.831	2.875557311	171.1733	2.504578	319.6173	807.6488	898.788	3.675779	4.63027	243.3598	467.2863	[-11059] N	-0.04703	0.496507	7.532563	1.117438	405.6558	9.812125	18.11111	0	5421.506	285.6811	100.3088
08-Dec-18 00:00:00	08-Dec-18 01:00:00	227.364	2.96139582	195.0475	2.504593	319.0252	809.0168	898.0806	3.441471	4.824424	249.6094	457.1343	[-11059] N	-0.05363	0.50929	7.489746	1.129904	404.7248	9.841241	17.66918	0	5420.892	285.6374	100.2381
08-Dec-18 01:00:00	08-Dec-18 02:00:00	239.1962	3.047234329	185.0945	2.504608	316.4116	810.3814	897.93	3.780466	4.810955	255.859	447.0156	[-11059] N	-0.06022	0.513077	7.469381	1.142267	408.2582	9.797539	17.39931	0	5420.425	285.6218	100.3644

		NO	NO2	SO2	Opacity	Temperature of gases leaving the kiln	Temperature of gases K5 top	Temperature of gases leaving the calciner	Residual Oxygen at back end of the kiln	Residual Oxygen at calciner down comer duct	CO at back end of the kiln?	CO at calciner down comer duct	THC (as CH4) in kiln stack gas	Kiln negative pressure	Calciner negative pressure	Preheater tower negative pressure	Raw mill negative pressure	Raw material feed rate	Conventional fuel feed rate - kiln	Conventional fuel feed rate - calciner	LCF/Alt fuel feed rate - calciner	Clinker hourly production rate	Calciner feed	Kiln feed
08-Dec-18 02:00:00	08-Dec-18 03:00:00	226.4582	3.133072838	165.6753	2.504622	315.2479	809.5058	897.8575	4.1813	4.667769	262.1085	449.3994	[-11059] N	-0.05328	0.513159	7.429728	1.13756	411.7081	9.784772	18.0712	0	5421.44	285.6397	100.2381
08-Dec-18 03:00:00	08-Dec-18 04:00:00	216.0969	3.218911347	161.6304	2.504637	313.5162	806.7107	897.9623	4.232806	4.418948	269.3184	447.5471	[-11059] N	-0.04572	0.509574	7.412195	1.150833	404.5917	9.629634	18.28877	0	5421.463	285.6493	100.1879
08-Dec-18 04:00:00	08-Dec-18 05:00:00	212.4953	3.304749856	160.9484	2.504652	311.2561	804.7384	897.3903	4.110267	4.071473	282.6716	462.5845	[-11059] N	-0.04405	0.498425	7.413971	1.132704	395.875	9.609981	18.66433	0	5421.923	285.587	100.4697
08-Dec-18 05:00:00	08-Dec-18 06:00:00	218.6199	3.390588365	161.3461	2.496492	309.6296	804.3405	898.3922	10.82193	4.033917	297.1148	459.1582	[-11059] N	-0.04086	0.479227	7.366351	1.133269	396.9751	9.745392	18.55782	0	5422.028	285.645	100.1748
08-Dec-18 06:00:00	08-Dec-18 07:00:00	168.6477	13.24046569	125.1623	2.478811	307.7278	803.9813	897.8138	15.16757	4.101196	311.558	465.9178	[-11059] N	-0.04115	0.48376	7.359636	1.13163	398.2071	9.819014	18.40619	0	5421.893	285.6558	100.2021
08-Dec-18 07:00:00	08-Dec-18 08:00:00	208.89	2.722132524	161.854	2.461117	306.4899	804.3033	898.066	3.746505	4.075585	326.0012	470.0653	[-11059] N	-0.0422	0.480846	7.355744	1.135772	392.2817	9.909486	18.4544	0	5422.164	285.6265	100.4297
08-Dec-18 08:00:00	08-Dec-18 09:00:00	120.955	2.697932352	113.3103	2.443423	306.4159	805.655	898.2671	3.569445	4.020712	340.4444	487.8213	[-11059] N	-0.04015	0.489384	7.359773	1.147557	390.1257	9.957879	18.3758	0	5422.129	285.6982	100.4909
08-Dec-18 09:00:00	08-Dec-18 10:00:00	144.2563	2.67373218	133.2378	2.425728	305.0636	807.0171	898.6462	2.974289	4.219416	354.8876	462.6277	[-11059] N	-0.03944	0.493579	7.334165	1.150135	391.37	10.07424	17.99641	0	5421.558	285.6302	100.3658
08-Dec-18 10:00:00	08-Dec-18 11:00:00	165.7862	2.649532008	162.8481	2.408926	303.8264	808.571	898.287	2.530747	4.609032	365.693	459.5782	[-11059] N	-0.04831	0.505674	7.458792	1.137611	391.6662	9.810888	17.44292	0	5420.537	285.6551	100.1105
08-Dec-18 11:00:00	08-Dec-18 12:00:00	164.1051	2.625331836	153.24	2.404739	300.7392	810.4149	898.1103	2.718923	4.658486	367.3936	459.9613	[-11059] N	-0.051	0.510095	7.6507	1.15503	395.9084	9.585839	17.24331	0	5419.89	285.6191	100.4159
08-Dec-18 12:00:00	08-Dec-18 13:00:00	165.8267	2.601131664	192.3999	2.404634	298.329	811.8281	897.8589	2.961293	4.774991	368.6593	453.3846	[-11059] N	-0.06761	0.519082	7.879976	1.153859	392.4288	9.560566	17.24577	0	5419.612	285.6188	100.2878
08-Dec-18 13:00:00	08-Dec-18 14:00:00	162.9924	2.576931492	209.2511	2.40453	295.6409	811.7754	898.098	3.432639	4.772077	369.925	446.1722	137.0736	-0.07034	0.537067	7.875359	1.149436	400.5313	9.408846	16.61973	0	5418.614	285.6031	100.0695
08-Dec-18 14:00:00	08-Dec-18 15:00:00	166.9367	2.559115157	210.7226	2.404425	294.2323	811.6027	898.0323	3.282484	4.541498	371.5503	458.2653	135.2101	-0.06336	0.510489	7.850095	1.149564	404.6578	9.482161	17.18613	0	5419.763	285.6662	100.4117
08-Dec-18 15:00:00	08-Dec-18 16:00:00	162.58	2.569435308	211.4638	2.404321	292.2924	811.4299	897.5521	3.207579	4.564482	386.0984	445.579	133.145	-0.06417	0.524284	7.839125	1.156415	402.0021	9.405386	16.98041	0	5419.43	285.6256	100.2589
08-Dec-18 16:00:00	08-Dec-18 17:00:00	162.8399	2.583080157	234.0883	2.404216	290.9538	811.2572	898.3644	12.09845	4.444409	407.1113	447.4058	130.639	-0.05887	0.527508	7.937758	1.159454	399.0268	9.557882	17.17021	0	5419.825	285.6255	100.5002
08-Dec-18 17:00:00	08-Dec-18 18:00:00	170.3595	2.596725006	256.8557	2.404112	290.0302	811.0845	898.4804	20.13812	4.752959	428.1242	468.1989	118.4401	-0.06701	0.524147	7.974643	1.159998	409.4254	9.862262	16.5094	0	5412.364	285.289	100.2274
08-Dec-18 18:00:00	08-Dec-18 19:00:00	157.1023	2.610369855	325.486	2.404119	292.0358	812.0033	898.7346	20.1872	4.982749	449.1371	469.2755	125.2262	-0.07054	0.535053	8.063991	1.153675	412.4257	10.02678	15.99318	0	5405.928	284.9346	100.0189
08-Dec-18 19:00:00	08-Dec-18 20:00:00	169.0405	2.624014703	231.2435	2.404369	302.015	814.391	897.9064	3.48541	5.135905	523.5688	446.5836	132.3766	-0.06612	0.530088	8.009397	1.155099	408.5797	9.918986	15.91124	0	5406.861	284.9902	99.98933
08-Dec-18 20:00:00	08-Dec-18 21:00:00	163.7933	2.637659552	232.4948	2.404628	310.2319	815.8659	898.1808	2.430956	5.054529	521.9652	454.7416	133.1428	-0.06155	0.527116	8.042842	1.153582	405.1597	9.903426	15.75357	0	5415.27	285.3773	99.9573
08-Dec-18 21:00:00	08-Dec-18 22:00:00	232.8269	2.977202826	212.0836	2.404887	317.8706	815.1216	897.9529	2.627145	4.917542	526.5147	450.503	131.7373	-0.05817	0.517807	8.029776	1.151673	404.4951	9.965738	15.77817	0	5418.544	285.6887	100.5524
08-Dec-18 22:00:00	08-Dec-18 23:00:00	226.4021	3.521903704	225.7452	2.405146	325.5383	814.2795	897.9366	2.442384	5.10655	529.203	454.7294	132.9463	-0.06215	0.534237	8.015165	1.139764	405.7112	9.961515	15.51039	0	5418.191	285.6325	100.2715
08-Dec-18 23:00:00	09-Dec-18 00:00:00	227.1049	3.546116899	223.8453	2.405404	336.1541	813.4373	897.8348	2.431569	4.944268	531.8912	451.2712	132.6599	-0.06088	0.531513	8.037167	1.149045	403.6715	10.00752	15.68165	0	5418.456	285.6686	100.5963
09-Dec-18 00:00:00	09-Dec-18 01:00:00	222.079	3.513393117	218.8418	2.405663	347.1948	812.5952	898.1541	2.469038	4.919818	554.5381	451.6729	131.4116	-0.05855	0.525357	8.046379	1.144525	407.8288	9.899421	15.83861	0	5418.495	285.6441	100.2537
09-Dec-18 01:00:00	09-Dec-18 02:00:00	223.4572	3.480669335	237.5094	2.405922	358.6082	811.7531	898.0243	2.688301	5.000873	551.1323	433.9936	131.0654	-0.0588	0.524249	8.043778	1.13508	410.1861	9.792825	15.78546	0	5418.242	285.6165	100.2132
09-Dec-18 02:00:00	09-Dec-18 03:00:00	222.4292	3.447945552	216.5935	2.406101	370.0376	810.911	898.2769	13.96729	5.007342	539.6933	431.3589	128.8706	-0.05846	0.514441	8.001882	1.142812	400.0292	9.701509	15.6851	0	5418.073	285.6451	100.2225
09-Dec-18 03:00:00	09-Dec-18 04:00:00	210.8724	3.41522177	232.4999	2.406107	380.48	809.5641	898.4886	20.16245	4.939601	528.2865	440.3084	130.2373	-0.05676	0.522317	8.025873	1.128292	395.5376	9.912176	15.60769	0	5417.867	285.6843	100.3907
09-Dec-18 04:00:00	09-Dec-18 05:00:00	211.7253	3.382497988	234.7006	2.406107	390.1236	808.8714	897.4362	9.520061	5.135555	561.8918	436.0114	128.7863	-0.05924	0.509661	7.943233	1.111554	395.7588	10.20898	15.30828	0	5378.867	283.3136	99.61952
09-Dec-18 05:00:00	09-Dec-18 06:00:00	236.7281	3.341880455	247.7803	2.406107	399.5574	813.625	898.2035	2.157632	4.952382	633.0743	432.2366	129.0252	-0.0628	0.496169	7.955456	1.121501	395.2172	10.14891	15.61517	0	5411.466	285.276	100.1254
09-Dec-18 06:00:00	09-Dec-18 07:00:00	167.9728	13.34641061	179.5134	2.406107	406.3159	814.2262	897.1523	2.790412	4.977004	610.2395	429.7692	127.8003	-0.06074	0.530775	7.933263	1.130986	395.3547	9.851605	15.8396	0	5418.537	285.6367	100.2095
09-Dec-18 07:00:00	09-Dec-18 08:00:00	213.1536	3.119481564	239.142	2.406107	411.6492	812.7697	898.4548	2.746348	4.827722	587.4048	434.1814	126.685	-0.05919	0.51666	7.983445	1.134923	396.2853	9.788676	16.2324	0	5418.854	285.6597	100.2988
09-Dec-18 08:00:00	09-Dec-18 09:00:00	215.2439	3.158022499	256.0446	2.406107	415.6442	811.7581	898.0775	7.244293	5.046324	567.0263	441.2319	127.1297	-0.06086	0.527132	7.991279	1.154769	393.3789	9.873142	15.81109	0	5418.384	285.6908	100.303
09-Dec-18 09:00:00	09-Dec-18 10:00:00	204.0925	3.196563433	275.4006	2.406107	419.7586	812.152	897.517	20.13705	4.890591	564.2918	447.753	131.5452	-0.05858	0.525007	7.974469	1.144938	394.6505	9.972737	15.8102	0	5414.808	285.3729	100.417
09-Dec-18 10:00:00	09-Dec-18 11:00:00	219.2648	3.235104368	255.7946	2.402175	430.4636	812.1608	898.2068	9.462143	5.031233	594.3528	449.4726	134.3447	-0.06792	0.510835	7.944714	1.144493	394.0953	9.961703	16.01296	0	5394.971	284.2941	99.77254
09-Dec-18 11:00:00	09-Dec-18 12:00:00	204.156	3.273645303	300.7936	2.389715	445.152	814.5066	897.9927	1.615263	5.024912	853.1394	450.4414	135.8164	-0.07269	0.525016	7.977477	1.142837	397.3864	10.0258	15.88011	0	5405.918	284.9692	100.0019
09-Dec-18 12:00:00	09-Dec-18 13:00:00	214.5558	3.312186237	292.3319	2.376962	462.4059	815.2453	898.7943	1.755269	5.193011	661.0172	457.5194	131.7789	-0.06606	0.527112	7.959188	1.141732	400.7895	9.989139	15.44226	0	5406.317	284.9411	99.71264
09-Dec-18 13:00:00	09-Dec-18 14:00:00	206.3856	3.350727172	277.6035	2.364208	479.7797	815.7915	897.0688	1.767104	5.008898	877.1156	468.9287	133.9408	-0.06448	0.512337	7.941212	1.140892	397.2413	9.926081	15.61303	0	5335.149	283.6875	99.67949
09-Dec-18 14:00:00	09-Dec-18 15:00:00	227.9114	3.376916624	227.7327	2.351455	495.2221	816.3377	899.2608	2.454297	4.841499	649.9484	469.3905	135.1508	-0.06827	0.524876	7.985269	1.147156	399.7451	9.650564	15.62107	0	5443.535	293.3896	103.2059
09-Dec-18 15:00:00	09-Dec-18 16:00:00	228.3436	3.363079364	200.6188	2.338701	508.9809	816.1216	897.053	2.949864	4.902039	641.8954	462.756	137.2567	-0.07565	0.527758	7.916624	1.122357	394.9001	9.525591	15.81286	0	5324.128	285.6874	100.3902
09-Dec-18 16:00:00	09-Dec-18 17:00:00	220.9936	3.346177321	170.2835	2.325948	520.1394	814.8115	897.8016	2.904043	4.479371	633.8424	467.2476	144.117	-0.06583	0.51278	7.976913	1.101104	388.5979	9.632587	16.16189	0	5384.631	296.886	104.1262
09-Dec-18 17:00:00	09-Dec-18 18:00:00	194.3354	3.329275278	194.7992	2.313194	528.0317	813.5688	897.3734	2.501234	4.468204	638.0814	463.9137	152.1048	-0.06141	0.523325	7.996966	1.08196	395.1861	9.687157	16.20215	0	5397.195	297.6859	104.6171
09-Dec-18 18:00:00	09-Dec-18 19:00:00	202.7354	3.312373235	187.6581	2.30976	533.5631	812.6539	898.3607	2.389427	4.624483	625.1458	472.764	155.8026	-0.06427	0.531596	8.021175	1.046576	399.7271	9.667015	16.19685	0	5413.613	297.8872	104.5095
09-Dec-18 19:00:00	09-Dec-18 20:00:00	203.9117	3.295471191	170.721	2.32228	538.6068	811.7769	898.0314	2.611384	4.466177	614.8202	455.8305	150.5191	-0.06565	0.5223	8.040054	1.056705	402.0388	9.751445	16.43313	0	5419.214	298.2471	104.6591
09-Dec-18 20:00:00	09-Dec-18 21:00:00	202.6701	3.278569148	146.0772	2.335071	541.1957	810.8911	897.5956	12.42142	4.461397	636.126	446.5822	150.9227	-0.06374	0.522764	8.019476	1.025772	404.1697	9.708186	16.74555	0	5419.608	298.1848	104.8701
09-Dec-18 21:00:00	09-Dec-18 22:00:00	207.2289	3.261667105	153.346	2.347863	543.3355	808.6717	897.7375	20.02251	4.386124	652.0721	457.3455	147.729	-0.06155	0.509645	8.125891	1.019924	401.5851	9.827392	16.88496	0	5417.562	298.0821	104.5885
09-Dec-18 22:00:00	09-Dec-18 23:00:00	201.4451	3.276905885	167.3474	2.360655	546.0782	805.5398	898.4554	9.908087	4.371734	668.0457	470.2583	143.1438	-0.07772	0.532081	8.085468	1.023121	397.5357	9.989601	16.72145	0	5419.851	298.2417	104.6801
09-Dec-18 23:00:00	10-Dec-18 00:00:00	207.2332	3.356271606	158.3532	2.373446	550.368	809.7382	897.7258	2.463367	4.312889	675.3834	458.8004	140.9991	-0.06892	0.510165	7.766391	1.023309	399.5997	10.13214	16.81874	0	5420.302	298.2139	104.6234

Appendix D

Records of Operating Conditions - Details

D-1 Assessment of Parameters with Operational Limits

Operating Parameter	Quantity of Alternative Fuel (tonnes/hr)	Raw Material Feed Rate (tonnes/hr)	Kiln Temperature K5 [1] (°C)	Gas Residence Time Kiln	Calciner Temperature (°C)	Gas Residence Time Calciner	Kiln Back End Oxygen	Calciner Down Comer Duct Oxygen	Pressure Control (top of Preheat Tower) Negative Pressure	Conventional Fuel Feed Rate - Kiln (tonnes/hr)	Conventional Fuel Feed Rate - Calciner (tonnes/hr)	Clinker Production Rate (tonnes/d)	Kiln Operating Status
Operational Limits	**< 12 tph**	**> 250 tph**	**> 800°C**	**> 6 seconds**	**> 850°C**	**> 3 seconds**	**> 1%**	**> 3%**	**< 0 kPa**	**None**	**None**	**None**	**Normal**
Measurement	**Continuous**	**Continuous**	**1-hr Rolling Average**	**1-hr Rolling Average**	**1-hr Rolling Average**	**1-hr Rolling Average**	**1-hr Rolling Average**	**1-hr Rolling Average**	**Continuous**	**Continuous**	**Continuous**	**Continous**	**-**
Maximum	**12.0**	**418.9**	**823.3**	**11.2**	**906.5**	**3.7**	**17.6**	**6.1**	**-7.4**	**-**	**-**	**-**	
Average		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**9.1**	**13.6**	**5397.7**	
Date and Time													
10-Oct-18 12:00:00	5	413.62	809.68	10.53	904.16	3.58	2	5	-8.32	8.69	13.13	5209.15	Alternative Fuel 1
10-Oct-18 13:00:00	5	418.60	810.65	10.64	903.38	3.58	2	5	-8.32	8.63	13.18	5211.67	Alternative Fuel 1
11-Oct-18 15:00:00	0	418.93	804.20	9.50	903.75	3.41	2	5	-8.35	8.59	15.29	5511.16	Alternative Fuel 1
11-Oct-18 16:00:00	2	405.46	804.17	9.62	906.47	3.41	3	4	-8.37	8.60	15.30	5511.55	Alternative Fuel 1
11-Oct-18 17:00:00	4	407.69	804.15	9.71	903.74	3.40	4	4	-8.35	8.58	14.68	5510.60	Alternative Fuel 1
11-Oct-18 18:00:00	4	408.60	804.22	9.75	903.87	3.41	18	4	-8.31	8.59	14.91	5509.51	Alternative Fuel 1
11-Oct-18 19:00:00	3	414.56	804.83	9.82	903.98	3.41	3	4	-8.41	8.60	15.20	5511.36	Alternative Fuel 1
12-Oct-18 07:00:00	0	411.15	805.57	9.87	903.56	3.62	2	5	-8.35	9.19	16.15	5374.33	Alternative Fuel 1
12-Oct-18 08:00:00	1	408.69	809.87	9.45	904.76	3.49	2	5	-8.42	9.18	16.06	5512.12	Alternative Fuel 1
12-Oct-18 09:00:00	5	410.96	811.57	9.22	904.87	3.41	2	4	-8.40	9.16	14.94	5511.76	Alternative Fuel 1
12-Oct-18 10:00:00	5	411.04	812.77	9.22	903.86	3.41	2	5	-8.40	8.87	14.56	5510.90	Alternative Fuel 1
12-Oct-18 11:00:00	5	413.23	811.30	9.22	903.85	3.41	3	5	-8.39	8.77	14.79	5511.08	Alternative Fuel 1
12-Oct-18 12:00:00	5	412.38	811.39	9.22	903.66	3.41	2	4	-8.43	9.10	14.91	5511.56	Alternative Fuel 1
12-Oct-18 13:00:00	5	415.46	814.69	9.22	905.44	3.41	1	5	-8.41	9.09	14.20	5510.68	Alternative Fuel 1
12-Oct-18 14:00:00	4	415.99	818.02	9.22	903.61	3.41	2	5	-8.43	8.89	13.80	5509.90	Alternative Fuel 1
12-Oct-18 15:00:00	4	416.92	819.75	9.22	905.04	3.41	2	5	-8.41	8.93	13.37	5635.42	Alternative Fuel 1
12-Oct-18 16:00:00	4	413.42	820.17	9.02	903.28	3.34	1	5	-8.41	8.96	13.27	5270.57	Alternative Fuel 1
12-Oct-18 17:00:00	4	408.11	820.59	9.64	904.28	3.55	1	5	-8.36	8.90	13.59	5229.71	Alternative Fuel 1
12-Oct-18 18:00:00	3	410.02	821.00	11.24	904.30	3.57	2	5	-8.35	8.89	13.09	5223.40	Alternative Fuel 1
12-Oct-18 19:00:00	1	411.85	821.42	9.73	905.01	3.57	2	6	-8.35	8.77	13.45	5126.17	Alternative Fuel 1
04-Dec-18 12:00	3	403.62	819.22	9.52	901.58	3.51	2	5	-7.98	9.48	15.46	5404.38	Alternative Fuel 2
04-Dec-18 13:00	12	404.22	818.67	9.40	899.19	3.47	3	4	-7.90	9.43	11.52	5398.95	Alternative Fuel 2
04-Dec-18 14:00	3	402.55	815.11	9.41	895.90	3.48	4	5	-7.76	9.29	15.71	5402.76	Alternative Fuel 2
04-Dec-18 15:00	2	403.91	811.03	9.40	898.93	3.49	4	5	-7.66	9.38	16.20	5401.14	Alternative Fuel 2
04-Dec-18 16:00	12	408.51	810.55	9.41	900.11	3.48	3	4	-7.57	9.34	11.43	5398.69	Alternative Fuel 2
04-Dec-18 17:00	12	405.74	810.40	9.41	898.94	3.48	3	4	-7.44	9.39	10.84	5398.00	Alternative Fuel 2
04-Dec-18 18:00	12	398.98	811.87	9.41	898.20	3.48	3	4	-7.38	9.39	10.23	5397.10	Alternative Fuel 2
05-Dec-18 08:00	2	402.34	805.84	9.37	899.49	3.47	3	4	-7.48	9.05	16.94	5418.80	Alternative Fuel 2
05-Dec-18 09:00	12	404.96	808.00	9.38	900.17	3.47	2	3	-7.56	9.77	11.94	5412.98	Alternative Fuel 2
05-Dec-18 10:00	10	404.87	812.31	9.39	897.80	3.47	3	4	-7.55	9.70	11.36	5410.84	Alternative Fuel 2
05-Dec-18 11:00	12	404.91	811.67	9.39	898.58	3.48	3	4	-7.52	9.39	10.72	5410.88	Alternative Fuel 2
05-Dec-18 12:00	12	408.59	810.76	9.39	897.38	3.48	3	4	-7.45	9.48	10.73	5410.92	Alternative Fuel 2
05-Dec-18 13:00	11	409.26	811.64	9.39	897.74	3.48	3	4	-7.43	9.67	11.14	5411.36	Alternative Fuel 2
06-Dec-18 09:00	6	394.63	814.16	9.37	893.43	3.47	2	4	-7.58	9.41	13.98	5392.04	Alternative Fuel 2
06-Dec-18 10:00	2	400.67	823.29	9.42	890.88	3.50	2	4	-7.80	9.31	15.73	5316.82	Alternative Fuel 2
06-Dec-18 11:00	9	413.63	821.21	9.56	900.43	3.54	4	3	-7.59	8.72	10.93	4994.35	Alternative Fuel 2
06-Dec-18 12:00	12	408.38	819.59	10.17	899.71	3.72	3	3	-7.83	9.39	9.85	5371.15	Alternative Fuel 2
06-Dec-18 13:00	4	396.99	819.96	9.46	889.45	3.50	3	4	-7.89	9.39	15.16	5405.45	Alternative Fuel 2
06-Dec-18 16:00	7	411.86	817.88	9.37	900.67	3.47	2	4	-7.81	9.40	12.79	5415.80	Alternative Fuel 2
06-Dec-18 17:00	5	408.37	820.11	9.38	894.98	3.47	3	4	-7.82	9.39	14.11	5412.35	Alternative Fuel 2
06-Dec-18 18:00	8	414.28	817.11	9.39	899.44	3.49	7	3	-7.86	9.38	12.08	5412.68	Alternative Fuel 2
06-Dec-18 19:00	4	418.54	812.26	9.39	897.02	3.47	13	4	-7.48	9.72	13.85	5292.94	Alternative Fuel 2

[1] Cyclone K5 Top Temperature was used as the surrogate parameter for the Kiln Temperature.

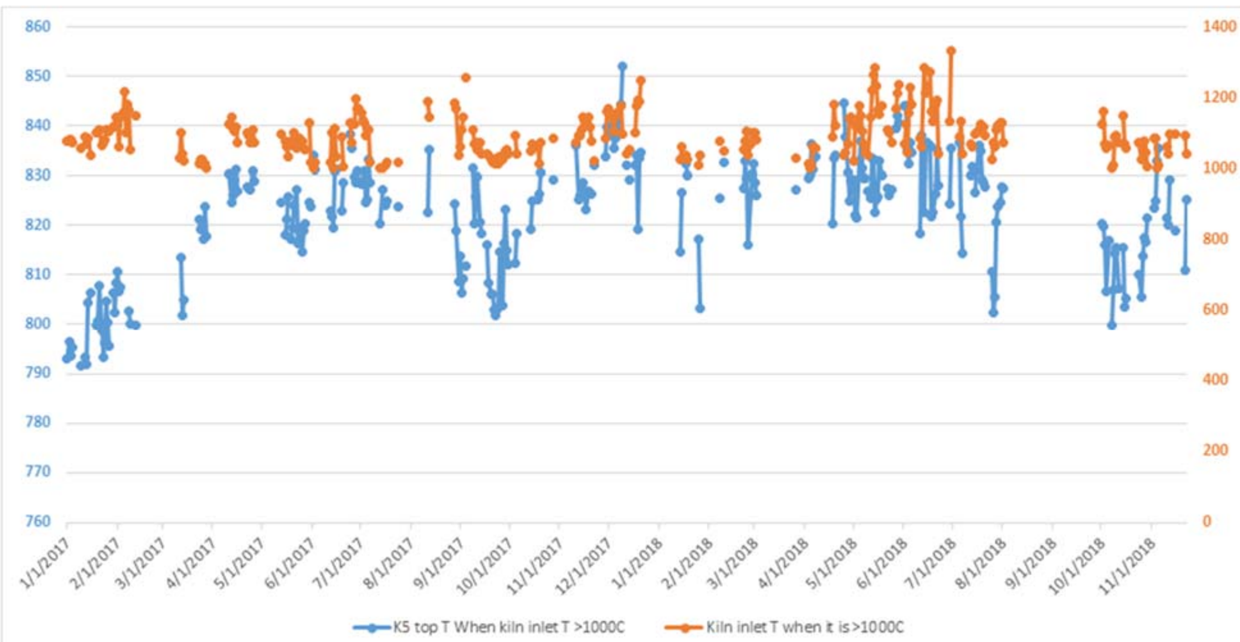
Surrogate Parameter for Temperature in the Kiln

The Bowmanville facility's ECA requires that the kiln temperature must remain no less than 1000˚C during the use of alternative fuels (AF) as specified in Schedule A1 of the ECA. Due to the high system temperatures, temperature probes cannot be physically installed inside the kiln and instead as approved by the Ministry, a temperature probe at the kiln inlet is used to predict the temperature inside the kiln. Due to constant material buildups, the readings of this temperature probe are unreliable, and this probe must be brought offline for cleaning on a weekly basis which create complications for source testing.

As such, SMC has adopted an alternative surrogate parameter, the temperature probe for the K5 cyclone which is connected to the AF interlock system. When the temperature for K5 cyclone reaches 800˚C, the temperature inside the cement kiln is expected to be higher than 1000˚C. A data graph supporting this surrogate parameter is presented below.

SMC is proposing to amend Schedule A2 of their ECA to reflect this change.

Temperature Graph



Note: The graph shows that when K5 top temperature (in blue) is higher than 800˚C, the kiln inlet temperature is higher than 1000˚C.

Appendix D-1

Assessment of Parameters with Operational Limits

D-2A CEM Records for Opacity, NO_x and SO_2 for Baseline

Date and Time	Opacity %	Normalized Stack SO_2 (g/tonne Clinker)	Normalized Stack NO_x (g/tonne Clinker)	Kiln Operating Status
Operational Limits	**< 20**	**None**	**None**	**Normal**
Measurement	**Continous**	**Continous**	**Continous**	**-**
Maximum	**3.9**	**3067.4**	**1756.2**	
Minimum	**3.8**	**1368.5**	**1364.8**	
Average	**3.8**	**2246.5**	**1467.6**	
30-Sep-18 12:00	3.80	2872.39	1457.59	Baseline
30-Sep-18 13:00	3.82	3067.37	1534.14	Baseline
30-Sep-18 14:00	3.84	2302.16	1408.62	Baseline
30-Sep-18 15:00	3.80	2380.54	1439.62	Baseline
30-Sep-18 16:00	3.83	3001.68	1481.78	Baseline
01-Oct-18 07:00	3.89	2910.79	1600.51	Baseline
01-Oct-18 08:00	3.91	2766.33	1377.18	Baseline
01-Oct-18 09:00	3.87	2728.14	1463.15	Baseline
01-Oct-18 10:00	3.78	1869.36	1381.04	Baseline
01-Oct-18 11:00	3.81	1989.11	1471.20	Baseline
01-Oct-18 12:00	3.82	1710.18	1416.36	Baseline
01-Oct-18 13:00	3.81	2148.68	1502.34	Baseline
01-Oct-18 14:00	3.87	1868.92	1441.59	Baseline
01-Oct-18 15:00	3.77	1368.47	1450.36	Baseline
01-Oct-18 16:00	3.75	1851.93	1460.72	Baseline
02-Oct-18 08:00	3.88	1945.96	1364.80	Baseline
02-Oct-18 09:00	3.85	1867.18	1465.46	Baseline
02-Oct-18 10:00	3.80	2010.28	1418.40	Baseline
02-Oct-18 11:00	3.86	2209.37	1461.00	Baseline
02-Oct-18 12:00	3.80	2060.76	1756.21	Baseline

D-2B CEM Records for Opacity, NO_x and SO_2 for Alternative Fuel 1

Date and Time	Opacity %	Normalized Stack SO_2 (g/tonne Clinker)	Normalized Stack NO_x (g/tonne Clinker)	Kiln Operating Status
Operational Limits	**< 20**	**None**	**None**	**Normal**
Measurement	**Continous**	**Continous**	**Continous**	**-**
Maximum	**4.0**	**3917.2**	**1762.8**	
Minimum	**3.7**	**2043.6**	**1156.2**	
Average	**3.8**	**2633.1**	**1507.5**	
10-Oct-18 12:00	3.80	2043.57	1487.64	Alternative Fuel 1
10-Oct-18 13:00	3.79	2098.59	1465.32	Alternative Fuel 1
11-Oct-18 15:00	3.86	2129.63	1732.57	Alternative Fuel 1
11-Oct-18 16:00	3.79	2220.17	1697.56	Alternative Fuel 1
11-Oct-18 17:00	3.83	2228.74	1762.77	Alternative Fuel 1
11-Oct-18 18:00	3.85	2475.05	1650.15	Alternative Fuel 1
11-Oct-18 19:00	3.79	2198.75	1634.83	Alternative Fuel 1
12-Oct-18 07:00	3.80	2050.40	1156.15	Alternative Fuel 1
12-Oct-18 08:00	3.84	2341.35	1334.31	Alternative Fuel 1
12-Oct-18 09:00	3.72	2640.23	1603.52	Alternative Fuel 1
12-Oct-18 10:00	3.69	2205.48	1533.19	Alternative Fuel 1
12-Oct-18 11:00	3.69	2174.78	1482.12	Alternative Fuel 1
12-Oct-18 12:00	3.79	2801.12	1497.08	Alternative Fuel 1
12-Oct-18 13:00	3.81	3297.50	1528.97	Alternative Fuel 1
12-Oct-18 14:00	3.89	3306.21	1479.32	Alternative Fuel 1
12-Oct-18 15:00	3.89	3215.55	1403.72	Alternative Fuel 1
12-Oct-18 16:00	3.96	3214.41	1437.79	Alternative Fuel 1
12-Oct-18 17:00	3.97	3187.89	1398.18	Alternative Fuel 1
12-Oct-18 18:00	3.97	3917.18	1394.41	Alternative Fuel 1
12-Oct-18 19:00	3.90	2914.65	1469.81	Alternative Fuel 1

D-2C CEM Records for Opacity, NO_x and SO_2 for Alternative Fuel 2

Date and Time	Opacity %	Normalized Stack SO_2 (g/tonne Clinker)	Normalized Stack NO_x (g/tonne Clinker)	Kiln Operating Status
Operational Limits	**< 20**	**None**	**None**	**Normal**
Measurement	**Continous**	**Continous**	**Continous**	**-**
Maximum	**2.6**	**3562.4**	**1734.0**	
Minimum	**2.4**	**1902.6**	**1073.5**	
Average	**2.5**	**2724.3**	**1397.4**	
04-Dec-18 12:00	2.58	3331.29	1480.53	Alternative Fuel 2
04-Dec-18 13:00	2.57	2962.70	1292.95	Alternative Fuel 2
04-Dec-18 14:00	2.56	1902.63	1588.37	Alternative Fuel 2
04-Dec-18 15:00	2.54	2924.55	1303.76	Alternative Fuel 2
04-Dec-18 16:00	2.54	2640.07	1223.13	Alternative Fuel 2
04-Dec-18 17:00	2.54	2662.53	1367.54	Alternative Fuel 2
04-Dec-18 18:00	2.54	3123.10	1272.89	Alternative Fuel 2
05-Dec-18 08:00	2.64	2605.87	1503.19	Alternative Fuel 2
05-Dec-18 09:00	2.47	2948.46	1441.69	Alternative Fuel 2
05-Dec-18 10:00	2.49	2253.98	1602.11	Alternative Fuel 2
05-Dec-18 11:00	2.51	1922.73	1442.45	Alternative Fuel 2
05-Dec-18 12:00	2.52	2496.70	1468.72	Alternative Fuel 2
05-Dec-18 13:00	2.54	2735.68	1520.48	Alternative Fuel 2
06-Dec-18 09:00	2.41	2940.69	1202.58	Alternative Fuel 2
06-Dec-18 10:00	2.43	3020.98	1073.54	Alternative Fuel 2
06-Dec-18 11:00	2.46	2087.66	1248.30	Alternative Fuel 2
06-Dec-18 12:00	2.49	2889.28	1435.98	Alternative Fuel 2
06-Dec-18 13:00	2.50	2294.04	1340.31	Alternative Fuel 2
06-Dec-18 16:00	2.50	3511.62	1330.77	Alternative Fuel 2
06-Dec-18 17:00	2.50	2461.08	1435.19	Alternative Fuel 2
06-Dec-18 18:00	2.50	2656.37	1434.33	Alternative Fuel 2
06-Dec-18 19:00	2.51	3562.44	1733.98	Alternative Fuel 2

D-2D CEM Records for Opacity, NO_x and SO_2 for Post Baseline

Date and Time	Opacity %	Normalized Stack SO_2 (g/tonne Clinker)	Normalized Stack NO_x (g/tonne Clinker)	Kiln Operating Status
Operational Limits	**< 20**	**None**	**None**	**Normal**
Measurement	**Continous**	**Continous**	**Continous**	**-**
Maximum	**2.6**	**2701.5**	**1987.8**	
Minimum	**2.3**	**1190.3**	**1151.3**	
Average	**2.4**	**1815.6**	**1550.1**	
07-Dec-18 08:00	2.51	2035.88	1562.79	Post Baseline
07-Dec-18 09:00	2.51	1288.88	1575.47	Post Baseline
07-Dec-18 10:00	2.49	1313.49	1529.29	Post Baseline
07-Dec-18 11:00	2.31	1190.34	1568.14	Post Baseline
07-Dec-18 12:00	2.60	1507.83	1557.25	Post Baseline
07-Dec-18 13:00	2.42	1618.40	1578.13	Post Baseline
07-Dec-18 14:00	2.42	1334.34	1595.49	Post Baseline
07-Dec-18 15:00	2.43	1735.64	1547.36	Post Baseline
07-Dec-18 16:00	2.45	1893.58	1568.03	Post Baseline
07-Dec-18 17:00	2.46	1977.64	1549.07	Post Baseline
07-Dec-18 18:00	2.47	2492.47	1987.83	Post Baseline
08-Dec-18 08:00	2.44	1469.37	1151.32	Post Baseline
08-Dec-18 09:00	2.43	1731.50	1371.00	Post Baseline
08-Dec-18 10:00	2.41	2109.97	1566.96	Post Baseline
08-Dec-18 11:00	2.40	1983.26	1549.36	Post Baseline
08-Dec-18 12:00	2.40	2481.64	1559.83	Post Baseline
08-Dec-18 13:00	2.40	2701.55	1534.81	Post Baseline

Appendix D-2

CEM Records for Opacity, NOx and SO_2

Table E-1-1: Summary of Kiln Stack Emissions

Contaminant	CAS Number	Kiln Stack Emission Rate (g/s)			Alt Fuel Emissions Outside the Baseline Normal Range (Yes/No)	Statistically Significant Change in Emissions between Alt Fuel and Baseline/Post Baseline? (Yes/No)
		Baseline (Oct 2018)	Alt Fuel (Dec 2018)	Post Baseline (Dec 2018)		
Particulate						
PM	PM	2.02E+00	4.17E+00	4.12E+00	Yes	Yes
PM10	PM10	4.61E-01	5.08E-01	3.86E-01	Yes	Yes
PM2.5	PM2.5	1.84E-01	2.12E-01	1.75E-01	Yes	Yes
Combustion Gases						
NO_X	10102-44-0	8.94E+01	8.67E+01	9.73E+01	Yes	Yes
SO_2	7446-09-5	1.37E+02	1.69E+02	1.14E+02	Yes	Yes
CO	630-08-0	1.19E+02	1.00E+02	7.49E+01	No	n/a
CO_2	124-38-9	5.96E+04	5.59E+04	5.51E+04	No	n/a
Ammonia						
Ammonia	7664-41-7	5.95E+00	5.22E+00	4.06E+00	No	n/a
Hydrogen Chloride						
Hydrochloric Acid	7647-01-0	1.45E+00	1.67E+00	6.03E-01	Yes	Yes
Metals and Metal Oxides						
Aluminum	7429-90-5	6.07E-02	2.11E-02	1.47E-02	No	n/a
Aluminum Oxide (1)	1344-28-1	1.15E-01	3.99E-02	2.78E-02	No	n/a
Antimony	7440-36-0	< 4.36E-04	< 5.07E-04	< 5.26E-04	No	n/a
Arsenic	7440-38-2	< 1.39E-04	< 1.35E-04	< 1.40E-04	No	n/a
Barium	7440-39-3	1.78E-03	1.91E-03	1.67E-03	Yes	Yes
Beryllium	7440-41-7	< 2.62E-05	< 3.00E-05	< 3.16E-05	No	n/a
Boron	7440-42-8	< 5.30E-03	< 5.07E-03	< 5.26E-03	No	n/a
Cadmium	7440-43-9	3.15E-05	< 3.00E-05	< 3.20E-05	No	n/a
Calcium Oxide	1305-78-8	9.69E-01	2.20E-01	1.16E-01	No	n/a
Chromium	7440-47-3	< 5.30E-04	< 5.07E-04	< 5.30E-04	No	n/a
Cobalt	7440-48-4	< 2.03E-04	< 3.20E-05	< 3.00E-05	No	n/a
Copper	7440-50-8	3.27E-04	< 3.73E-04	< 2.67E-04	No	n/a
Iron	7439-89-6	4.56E-02	2.36E-02	1.69E-02	No	n/a
Ferric Oxide(1)	1309-37-1	1.30E-01	6.75E-02	4.83E-02	No	n/a
Lead	7439-92-1	1.19E-03	3.00E-04	1.80E-04	No	n/a
Magnesium	7439-95-4	3.01E-02	1.80E-02	1.09E-02	No	n/a
Magnesium Oxide(1)	1309-48-4	4.99E-02	2.98E-02	1.81E-02	No	n/a
Manganese	7439-96-5	1.71E-03	2.37E-03	5.50E-04	Yes	Yes
Mercury	7439-97-6	4.03E-04	3.06E-04	< 1.73E-04	No	n/a
Molybdenum	7439-98-7	8.93E-04	8.08E-04	1.03E-03	Yes	Yes
Nickel	7440-02-0	5.18E-04	4.17E-04	3.21E-04	No	n/a
Phosphorus	7723-14-0	< 1.34E-02	< 1.55E-02	< 1.61E-02	No	n/a
Potassium	7440-09-7	1.07E-01	< 2.66E-02	< 2.10E-02	No	n/a
Selenium	7782-49-2	< 2.91E-04	< 3.38E-04	< 3.51E-04	No	n/a
Silver	7440-22-4	< 3.60E-04	< 4.60E-05	< 5.00E-05	No	n/a
Strontium	7440-24-6	1.39E-03	4.98E-04	2.20E-04	No	n/a
Thallium	7440-28-0	< 4.12E-05	< 4.10E-05	< 4.20E-05	No	n/a
Tin	7440-31-5	8.41E-03	3.34E-03	2.90E-03	No	n/a
Titanium	7440-32-6	3.68E-03	1.85E-03	1.51E-03	No	n/a
Vanadium	7440-62-2	< 1.02E-04	< 1.01E-04	< 1.05E-04	No	n/a
Zinc	7440-66-6	< 2.64E-03	< 2.82E-03	< 1.75E-03	No	n/a
Volatile Organic Matter						
Acetone (2-Propanone)	67-64-1	9.82E-02	1.23E-01	8.06E-02	Yes	Yes
Benzene	71-43-2	2.44E-01	2.48E-01	2.77E-01	No	n/a
Bromodichloromethane	75-27-4	< 1.66E-04	< 1.56E-04	< 1.57E-04	No	n/a
Bromoform	75-25-2	< 2.11E-04	< 1.99E-04	< 2.00E-04	No	n/a
Bromomethane	74-83-9	< 4.10E-03	1.11E-02	< 6.76E-03	Yes	Yes
Methyl Ethyl Ketone (2-Butanone)	78-93-3	< 5.43E-04	< 5.11E-04	< 5.14E-04	No	n/a
Carbon Tetrachloride	56-23-5	< 2.41E-04	< 2.27E-04	< 2.28E-04	No	n/a
Chlorobenzene	108-90-7	5.60E-03	8.25E-03	< 5.21E-03	Yes	Yes
Chloroethane	75-00-3	8.22E-03	8.90E-03	8.90E-03	No	n/a
Chloroform	67-66-3	< 1.66E-04	< 1.56E-04	< 1.57E-04	No	n/a
Chloromethane	74-87-3	7.31E-02	9.12E-02	1.02E-01	No	n/a
Cumene	98-82-8	< 6.41E-02	< 1.11E-02	< 1.43E-02	No	n/a
Dibromochloromethane	124-48-1	< 1.36E-04	< 1.28E-04	< 1.28E-04	No	n/a
1,1-Dichloroethane	75-34-3	< 1.81E-04	< 1.70E-04	< 1.71E-04	No	n/a
1,2-Dichloroethane	107-06-2	< 1.06E-04	< 9.90E-05	< 1.00E-04	No	n/a
1,1-Dichloroethylene	75-35-4	< 1.66E-04	< 1.56E-04	< 1.57E-04	No	n/a
cis-1,2-Dichloroethylene	156-59-2	< 1.51E-04	< 1.42E-04	< 1.43E-04	No	n/a
trans-1,2-Dichloroethylene	156-60-5	< 1.51E-04	< 1.42E-04	< 1.43E-04	No	n/a
1,2-Dichloropropane	78-87-5	< 1.66E-04	< 1.56E-04	< 1.57E-04	No	n/a
Ethylbenzene	100-41-4	3.23E-02	3.73E-02	3.98E-02	No	n/a
Ethylene Dibromide	106-93-4	< 1.51E-04	< 1.42E-04	< 1.43E-04	No	n/a
Methylene Chloride(Dichloromethane)	75-09-2	< 2.87E-04	< 2.70E-04	< 2.71E-04	No	n/a
Styrene	100-42-5	3.42E-02	2.93E-02	3.97E-02	Yes	Yes
1,1,1,2-Tetrachloroethane	630-20-6	< 1.51E-04	< 1.42E-04	< 1.43E-04	No	n/a
1,1,2,2-Tetrachloroethane	79-34-5	< 2.11E-04	< 1.99E-04	< 2.00E-04	No	n/a
Tetrachloroethylene	127-18-4	< 2.72E-04	< 2.56E-04	< 2.57E-04	No	n/a
1,1,1-Trichloroethane	71-55-6	< 2.11E-04	< 1.99E-04	< 2.00E-04	No	n/a
1,1,2-Trichloroethane	79-00-5	< 2.41E-04	< 2.27E-04	< 2.28E-04	No	n/a
Trichloroethylene	79-01-6	< 1.66E-04	< 1.56E-04	< 1.57E-04	No	n/a
Toluene	108-88-3	1.40E-01	1.61E-01	2.08E-01	No	n/a
Vinyl Chloride	75-01-4	< 1.96E-04	< 7.03E-04	< 1.85E-04	No	n/a
Xylene	1330-20-7	1.71E-01	2.17E-01	2.58E-01	No	n/a
Dioxins, Furans and Dioxin-like PCBs						
Dioxins, Furans and Dioxin-like PCBs	CDD	2.74E-09	1.89E-09	1.93E-09	Yes	Yes

Table E-1-1: Summary of Kiln Stack Emissions

Contaminant	CAS Number	Kiln Stack Emission Rate (g/s) Baseline (Oct 2018)	Alt Fuel (Dec 2018)	Post Baseline (Dec 2018)	Alt Fuel Emissions Outside the Baseline Normal Range (Yes/No)	Statistically Significant Change in Emissions between Alt Fuel and Baseline/Post Baseline? (Yes/No)
Polycyclic Aromatic Hydrocarbons (PAHs)						
Acenaphthene	83-32-9	4.51E-04	3.42E-04	3.66E-04	Yes	Yes
Acenaphthylene	208-96-8	5.62E-04	4.59E-04	7.60E-04	Yes	Yes
Anthracene	120-12-7	4.20E-05	< 2.60E-05	< 2.75E-05	No	n/a
Benzo(a)anthracene	56-55-3	2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Benzo(b)fluoranthene	205-99-2	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Benzo(k)fluoranthene	207-08-9	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Benzo(a)fluorene	238-84-6	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Benzo(b)fluorene	30777-19-6	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Benzo(g,h,i)perylene	191-24-2	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Benzo(a)pyrene	50-32-8	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Benzo(e)pyrene	192-97-2	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
2-Chloronaphthalene	91-58-7	3.94E-04	2.99E-04	3.65E-04	Yes	Yes
Chrysene	218-01-9	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Coronene	191-07-1	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Dibenzo(a,c)anthracene	215-58-7	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
9,10-Dimethylanthracene	781-43-1	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
7,12-Dimethylbenzo(a)anthracene	57-97-6	< 8.70E-05	< 8.67E-05	< 8.69E-05	No	n/a
Fluoranthene	206-44-0	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Fluorene	86-73-7	2.15E-04	1.87E-04	2.04E-04	Yes	Yes
Indeno(1,2,3-cd)pyrene	193-39-5	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
2-Methylanthracene	613-12-7	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
3-Methylcholanthrene	56-49-5	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
1-Methylnaphthalene	90-12-0	2.27E-02	2.19E-02	2.14E-02	No	n/a
2-Methylnaphthalene	91-57-6	3.17E-02	3.24E-02	3.34E-02	No	n/a
1-Methylphenanthrene	832-69-9	6.38E-05	7.10E-05	5.65E-05	Yes	Yes
9-methylphenanthrene	883-20-5	1.47E-04	1.71E-04	1.25E-04	Yes	Yes
Naphthalene	91-20-3	< 5.42E-02	4.94E-02	4.75E-02	No	n/a
Perylene	198-55-0	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Phenanthrene	85-01-8	< 9.19E-04	7.54E-04	7.46E-04	No	n/a
Picene	213-46-7	2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Pyrene	129-00-0	2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Tetralin	119-64-2	< 1.41E-02	1.34E-02	1.19E-02	No	n/a
Triphenylene	217-59-4	2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Chloronated Organics						
1,2-Dichlorobenzene	95-50-1	< 4.99E-04	3.59E-04	5.00E-04	Yes	Yes
1,3-Dichlorobenzene	541-73-1	1.54E-04	1.70E-04	2.54E-04	No	n/a
1,4-Dichlorobenzene	106-46-7	1.19E-04	1.99E-04	2.69E-04	No	n/a
1,2,3-Trichlorobenzene	87-61-6	1.31E-04	1.00E-04	1.94E-04	Yes	Yes
1,2,4-Trichlorobenzene	120-82-1	< 1.14E-04	1.14E-04	1.82E-04	Yes	No
1,3,5-Trichlorobenzene	108-70-3	< 2.39E-05	< 2.17E-05	< 2.17E-05	No	n/a
1,2,3,4-Tetrachlorobenzene	634-66-2	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
1,2,3,5+1,2,4,5-Tetrachlorobenzene	634-90-2 / 95-94-3	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Pentachlorobenzene	608-93-5	< 2.18E-05	< 2.17E-05	2.20E-05	No	n/a
Hexachlorobenzene	118-74-1	2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
2-Chlorophenol	95-57-8	< 5.21E-04	1.43E-03	1.33E-03	Yes	Yes
3-Chlorophenol (m-Chlorophenol)	108-43-0	8.16E-05	1.65E-04	2.13E-04	No	n/a
4-Chlorophenol (p-Chlorophenol)	106-48-9	< 1.17E-04	1.31E-04	1.75E-04	No	n/a
2,3-Dichlorophenol	576-24-9	< 2.18E-05	< 2.17E-05	< 6.52E-05	No	n/a
2,4 + 2,5-Dichlorophenol	120-83-2 / 583-78-8	< 2.18E-05	3.49E-05	< 7.48E-05	No	n/a
2,6-Dichlorophenol	87-65-0	< 2.18E-05	< 2.17E-05	< 6.52E-05	No	n/a
3,4-Dichlorophenol	95-77-2	< 2.18E-05	< 2.17E-05	< 6.52E-05	No	n/a
3,5-Dichlorophenol	591-35-5	< 2.18E-05	< 2.45E-05	< 6.52E-05	No	n/a
2,3,4-Trichlorophenol	15950-66-0	< 2.18E-05	< 2.17E-05	< 6.52E-05	No	n/a
2,3,5-Trichlorophenol	933-78-8	< 2.18E-05	< 2.17E-05	< 6.50E-05	No	n/a
2,3,6-Trichlorophenol	933-75-5	< 2.18E-05	< 2.17E-05	< 6.52E-05	No	n/a
2,4,5-Trichlorophenol	95-95-4	< 2.18E-05	< 2.17E-05	< 6.52E-05	No	n/a
2,4,6-Trichlorophenol	88-06-2	< 2.18E-05	< 2.17E-05	< 6.52E-05	No	n/a
3,4,5-Trichlorophenol	609-19-8	< 2.18E-05	< 2.17E-05	< 6.52E-05	No	n/a
2,3,4,5-Tetrachlorophenol	4901-51-3	2.18E-05	< 2.17E-05	< 6.50E-05	No	n/a
2,3,4,6-Tetrachlorophenol	58-90-2	2.18E-05	< 2.17E-05	< 6.50E-05	No	n/a
2,3,5,6-Tetrachlorophenol	935-95-5	< 2.18E-05	< 2.17E-05	< 6.50E-05	No	n/a
Pentachlorophenol	87-86-5	< 2.18E-05	< 2.17E-05	< 6.52E-05	No	n/a

Appendix E

Assessment of Compliance with Reg 419 - Details

Appendix E-1

Emission Calculation Sheets for Kiln Stack Emissions

Table E-1-1: Summary of Kiln Stack Emissions

Contaminant	CAS Number	Kiln Stack Emission Rate (g/s)			Alt Fuel Emissions Outside the Baseline Normal Range (Yes/No)	Statistically Significant Change in Emissions between Alt Fuel and Baseline/Post Baseline? (Yes/No)
		Baseline (Oct 2018)	Alt Fuel (Dec 2018)	Post Baseline (Dec 2018)		
Particulate						
PM	PM	2.02E+00	4.17E+00	4.12E+00	Yes	Yes
PM10	PM10	4.61E-01	5.08E-01	3.86E-01	Yes	Yes
PM2.5	PM2.5	1.84E-01	2.12E-01	1.75E-01	Yes	Yes
Combustion Gases						
NO_X	10102-44-0	8.94E+01	8.67E+01	9.73E+01	Yes	Yes
SO_2	7446-09-5	1.37E+02	1.69E+02	1.14E+02	Yes	Yes
CO	630-08-0	1.19E+02	1.00E+02	7.49E+01	No	n/a
CO_2	124-38-9	5.96E+04	5.59E+04	5.51E+04	No	n/a
Ammonia						
Ammonia	7664-41-7	5.95E+00	5.22E+00	4.06E+00	No	n/a
Hydrogen Chloride						
Hydrochloric Acid	7647-01-0	1.45E+00	1.67E+00	6.03E-01	Yes	Yes
Metals and Metal Oxides						
Aluminum	7429-90-5	6.07E-02	2.11E-02	1.47E-02	No	n/a
Aluminum Oxide (1)	1344-28-1	1.15E-01	3.99E-02	2.78E-02	No	n/a
Antimony	7440-36-0	< 4.36E-04	< 5.07E-04	< 5.26E-04	No	n/a
Arsenic	7440-38-2	< 1.39E-04	< 1.35E-04	< 1.40E-04	No	n/a
Barium	7440-39-3	1.78E-03	1.91E-03	1.67E-03	Yes	Yes
Beryllium	7440-41-7	< 2.62E-05	< 3.00E-05	< 3.16E-05	No	n/a
Boron	7440-42-8	< 5.30E-03	< 5.07E-03	< 5.26E-03	No	n/a
Cadmium	7440-43-9	3.15E-05	< 3.00E-05	< 3.20E-05	No	n/a
Calcium Oxide	1305-78-8	9.69E-01	2.20E-01	1.16E-01	No	n/a
Chromium	7440-47-3	< 5.30E-04	< 5.07E-04	< 5.30E-04	No	n/a
Cobalt	7440-48-4	< 2.03E-04	< 3.20E-05	< 3.00E-05	No	n/a
Copper	7440-50-8	3.27E-04	< 3.73E-04	< 2.67E-04	No	n/a
Iron	7439-89-6	4.56E-02	2.36E-02	1.69E-02	No	n/a
Ferric Oxide(1)	1309-37-1	1.30E-01	6.75E-02	4.83E-02	No	n/a
Lead	7439-92-1	1.19E-03	3.00E-04	1.80E-04	No	n/a
Magnesium	7439-95-4	3.01E-02	1.80E-02	1.09E-02	No	n/a
Magnesium Oxide(1)	1309-48-4	4.99E-02	2.98E-02	1.81E-02	No	n/a
Manganese	7439-96-5	1.71E-03	2.37E-03	5.50E-04	Yes	Yes
Mercury	7439-97-6	4.03E-04	3.06E-04	< 1.73E-04	No	n/a
Molybdenum	7439-98-7	8.93E-04	8.08E-04	1.03E-03	Yes	Yes
Nickel	7440-02-0	5.18E-04	4.17E-04	3.21E-04	No	n/a
Phosphorus	7723-14-0	< 1.34E-02	< 1.55E-02	< 1.61E-02	No	n/a
Potassium	7440-09-7	1.07E-01	< 2.66E-02	< 2.10E-02	No	n/a
Selenium	7782-49-2	< 2.91E-04	< 3.38E-04	< 3.51E-04	No	n/a
Silver	7440-22-4	< 3.60E-04	< 4.60E-05	< 5.00E-05	No	n/a
Strontium	7440-24-6	1.39E-03	4.98E-04	2.20E-04	No	n/a
Thallium	7440-28-0	< 4.12E-05	< 4.10E-05	< 4.20E-05	No	n/a
Tin	7440-31-5	8.41E-03	3.34E-03	2.90E-03	No	n/a
Titanium	7440-32-6	3.68E-03	1.85E-03	1.51E-03	No	n/a
Vanadium	7440-62-2	< 1.02E-04	< 1.01E-04	< 1.05E-04	No	n/a
Zinc	7440-66-6	< 2.64E-03	< 2.82E-03	< 1.75E-03	No	n/a
Volatile Organic Matter						
Acetone (2-Propanone)	67-64-1	9.82E-02	1.23E-01	8.06E-02	Yes	Yes
Benzene	71-43-2	2.44E-01	2.48E-01	2.77E-01	No	n/a
Bromodichloromethane	75-27-4	< 1.66E-04	< 1.56E-04	< 1.57E-04	No	n/a
Bromoform	75-25-2	< 2.11E-04	< 1.99E-04	< 2.00E-04	No	n/a
Bromomethane	74-83-9	< 4.10E-03	1.11E-02	< 6.76E-03	Yes	Yes
Methyl Ethyl Ketone (2-Butanone)	78-93-3	< 5.43E-04	< 5.11E-04	< 5.14E-04	No	n/a
Carbon Tetrachloride	56-23-5	< 2.41E-04	< 2.27E-04	< 2.28E-04	No	n/a
Chlorobenzene	108-90-7	5.60E-03	8.25E-03	< 5.21E-03	Yes	Yes
Chloroethane	75-00-3	8.22E-03	8.90E-03	8.90E-03	No	n/a
Chloroform	67-66-3	< 1.66E-04	< 1.56E-04	< 1.57E-04	No	n/a
Chloromethane	74-87-3	7.31E-02	9.12E-02	1.02E-01	No	n/a
Cumene	98-82-8	< 6.41E-02	< 1.11E-02	< 1.43E-02	No	n/a
Dibromochloromethane	124-48-1	< 1.36E-04	< 1.28E-04	< 1.28E-04	No	n/a
1,1-Dichloroethane	75-34-3	< 1.81E-04	< 1.70E-04	< 1.71E-04	No	n/a
1,2-Dichloroethane	107-06-2	< 1.06E-04	< 9.90E-05	< 1.00E-04	No	n/a
1,1-Dichloroethylene	75-35-4	< 1.66E-04	< 1.56E-04	< 1.57E-04	No	n/a
cis-1,2-Dichloroethylene	156-59-2	< 1.51E-04	< 1.42E-04	< 1.43E-04	No	n/a
trans-1,2-Dichloroethylene	156-60-5	< 1.51E-04	< 1.42E-04	< 1.43E-04	No	n/a
1,2-Dichloropropane	78-87-5	< 1.66E-04	< 1.56E-04	< 1.57E-04	No	n/a
Ethylbenzene	100-41-4	3.23E-02	3.73E-02	3.98E-02	No	n/a
Ethylene Dibromide	106-93-4	< 1.51E-04	< 1.42E-04	< 1.43E-04	No	n/a
Methylene Chloride(Dichloromethane)	75-09-2	< 2.87E-04	< 2.70E-04	< 2.71E-04	No	n/a
Styrene	100-42-5	3.42E-02	2.93E-02	3.97E-02	Yes	Yes
1,1,1,2-Tetrachloroethane	630-20-6	< 1.51E-04	< 1.42E-04	< 1.43E-04	No	n/a
1,1,2,2-Tetrachloroethane	79-34-5	< 2.11E-04	< 1.99E-04	< 2.00E-04	No	n/a
Tetrachloroethylene	127-18-4	< 2.72E-04	< 2.56E-04	< 2.57E-04	No	n/a
1,1,1-Trichloroethane	71-55-6	< 2.11E-04	< 1.99E-04	< 2.00E-04	No	n/a
1,1,2-Trichloroethane	79-00-5	< 2.41E-04	< 2.27E-04	< 2.28E-04	No	n/a
Trichloroethylene	79-01-6	< 1.66E-04	< 1.56E-04	< 1.57E-04	No	n/a
Toluene	108-88-3	1.40E-01	1.61E-01	2.08E-01	No	n/a
Vinyl Chloride	75-01-4	< 1.96E-04	< 7.03E-04	< 1.85E-04	No	n/a
Xylene	1330-20-7	1.71E-01	2.17E-01	2.58E-01	No	n/a
Dioxins, Furans and Dioxin-like PCBs						
Dioxins, Furans and Dioxin-like PCBs	CDD	2.74E-09	1.89E-09	1.93E-09	Yes	Yes

Table E-1-1: Summary of Kiln Stack Emissions

Contaminant	CAS Number	Kiln Stack Emission Rate (g/s)			Alt Fuel Emissions Outside the Baseline Normal Range (Yes/No)	Statistically Significant Change in Emissions between Alt Fuel and Baseline/Post Baseline? (Yes/No)
		Baseline (Oct 2018)	Alt Fuel (Dec 2018)	Post Baseline (Dec 2018)		
Polycyclic Aromatic Hydrocarbons (PAHs)						
Acenaphthene	83-32-9	4.51E-04	3.42E-04	3.66E-04	Yes	Yes
Acenaphthylene	208-96-8	5.62E-04	4.59E-04	7.60E-04	Yes	Yes
Anthracene	120-12-7	4.20E-05	< 2.60E-05	< 2.75E-05	No	n/a
Benzo(a)anthracene	56-55-3	2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Benzo(b)fluoranthene	205-99-2	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Benzo(k)fluoranthene	207-08-9	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Benzo(a)fluorene	238-84-6	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Benzo(b)fluorene	30777-19-6	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Benzo(g,h,i)perylene	191-24-2	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Benzo(a)pyrene	50-32-8	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Benzo(e)pyrene	192-97-2	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
2-Chloronaphthalene	91-58-7	3.94E-04	2.99E-04	3.65E-04	Yes	Yes
Chrysene	218-01-9	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Coronene	191-07-1	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Dibenzo(a,c)anthracene	215-58-7	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
9,10-Dimethylanthracene	781-43-1	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
7,12-Dimethylbenzo(a)anthracene	57-97-6	< 8.70E-05	< 8.67E-05	< 8.69E-05	No	n/a
Fluoranthene	206-44-0	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Fluorene	86-73-7	2.15E-04	1.87E-04	2.04E-04	Yes	Yes
Indeno(1,2,3-cd)pyrene	193-39-5	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
2-Methylanthracene	613-12-7	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
3-Methylcholanthrene	56-49-5	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
1-Methylnaphthalene	90-12-0	2.27E-02	2.19E-02	2.14E-02	No	n/a
2-Methylnaphthalene	91-57-6	3.17E-02	3.24E-02	3.34E-02	No	n/a
1-Methylphenanthrene	832-69-9	6.38E-05	7.10E-05	5.65E-05	Yes	Yes
9-methylphenanthrene	883-20-5	1.47E-04	1.71E-04	1.25E-04	Yes	Yes
Naphthalene	91-20-3	< 5.42E-02	4.94E-02	4.75E-02	No	n/a
Perylene	198-55-0	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Phenanthrene	85-01-8	< 9.19E-04	7.54E-04	7.46E-04	No	n/a
Picene	213-46-7	2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Pyrene	129-00-0	2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Tetralin	119-64-2	< 1.41E-02	1.34E-02	1.19E-02	No	n/a
Triphenylene	217-59-4	2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Chloronated Organics						
1,2-Dichlorobenzene	95-50-1	< 4.99E-04	3.59E-04	5.00E-04	Yes	Yes
1,3-Dichlorobenzene	541-73-1	1.54E-04	1.70E-04	2.54E-04	No	n/a
1,4-Dichlorobenzene	106-46-7	1.19E-04	1.99E-04	2.69E-04	No	n/a
1,2,3-Trichlorobenzene	87-61-6	1.31E-04	1.00E-04	1.94E-04	Yes	Yes
1,2,4-Trichlorobenzene	120-82-1	< 1.14E-04	1.14E-04	1.82E-04	Yes	No
1,3,5-Trichlorobenzene	108-70-3	< 2.39E-05	< 2.17E-05	< 2.17E-05	No	n/a
1,2,3,4-Tetrachlorobenzene	634-66-2	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
1,2,3,5+1,2,4,5-Tetrachlorobenzene	634-90-2 / 95-94-3	< 2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
Pentachlorobenzene	608-93-5	< 2.18E-05	< 2.17E-05	2.20E-05	No	n/a
Hexachlorobenzene	118-74-1	2.18E-05	< 2.17E-05	< 2.17E-05	No	n/a
2-Chlorophenol	95-57-8	< 5.21E-04	1.43E-03	1.33E-03	Yes	Yes
3-Chlorophenol (m-Chlorophenol)	108-43-0	8.16E-05	1.65E-04	2.13E-04	No	n/a
4-Chlorophenol (p-Chlorophenol)	106-48-9	< 1.17E-04	1.31E-04	1.75E-04	No	n/a
2,3-Dichlorophenol	576-24-9	< 2.18E-05	< 2.17E-05	< 6.52E-05	No	n/a
2,4 + 2,5-Dichlorophenol	120-83-2 / 583-78-8	< 2.18E-05	3.49E-05	< 7.48E-05	No	n/a
2,6-Dichlorophenol	87-65-0	< 2.18E-05	< 2.17E-05	< 6.52E-05	No	n/a
3,4-Dichlorophenol	95-77-2	< 2.18E-05	< 2.17E-05	< 6.52E-05	No	n/a
3,5-Dichlorophenol	591-35-5	< 2.18E-05	< 2.45E-05	< 6.52E-05	No	n/a
2,3,4-Trichlorophenol	15950-66-0	< 2.18E-05	< 2.17E-05	< 6.52E-05	No	n/a
2,3,5-Trichlorophenol	933-78-8	< 2.18E-05	< 2.17E-05	< 6.50E-05	No	n/a
2,3,6-Trichlorophenol	933-75-5	< 2.18E-05	< 2.17E-05	< 6.52E-05	No	n/a
2,4,5-Trichlorophenol	95-95-4	< 2.18E-05	< 2.17E-05	< 6.52E-05	No	n/a
2,4,6-Trichlorophenol	88-06-2	< 2.18E-05	< 2.17E-05	< 6.52E-05	No	n/a
3,4,5-Trichlorophenol	609-19-8	< 2.18E-05	< 2.17E-05	< 6.52E-05	No	n/a
2,3,4,5-Tetrachlorophenol	4901-51-3	2.18E-05	< 2.17E-05	< 6.50E-05	No	n/a
2,3,4,6-Tetrachlorophenol	58-90-2	2.18E-05	< 2.17E-05	< 6.50E-05	No	n/a
2,3,5,6-Tetrachlorophenol	935-95-5	< 2.18E-05	< 2.17E-05	< 6.50E-05	No	n/a
Pentachlorophenol	87-86-5	< 2.18E-05	< 2.17E-05	< 6.52E-05	No	n/a

Appendix E-2

Assessment of Significance – Ministry Methodology Section 7.1.2

Appendix E-2: Determination of Significant Contaminants – MINISTRY Methodology

For contaminants that are emitted from the kiln stack only, an assessment of significance was undertaken using the Ministry methodology presented in their Procedure for Preparing an ESDM Report, March 2018 (Ministry Procedure) as described below.

The MINISTRY Procedure, section 7.1.2 states that contaminants can be considered negligible (see Appendix F) if the emissions from the site using the distance to the property line from the closest emission source is less than the emission threshold developed with the Emission Threshold formula below.

$$\text{Emission Threshold (g/s)} = \frac{0.5 \text{ x MINISTRY POI Limit or JSL } [\mu g/m^3]}{\text{Dispersion Factor } [\mu g/m^3 \text{ per g/s emission}]}$$

The Ministry Procedure section 7.1.2 states that if the contaminant does not have a Ministry POI limit but does have a Jurisdictional Screening Level (JSL), the JSL can be used in place of the Ministry POI limit in the Emission Threshold calculation. For those contaminants without a Ministry POI limit or a JSL that are not listed in the Ministry Procedure - Table B-2B, a POI limit of 0.1 $\mu g/m^3$ was used for the calculation. For those contaminants without a Ministry POI limit that are listed in the Ministry Procedure -Table B-2B, a POI limit of 0.01 $\mu g/m^3$ was used for the calculation. Verification was obtained from the Ministry (by Scott Grant, May 2009) that only if a contaminant is listed in Table B-2B that has either a Ministry POI limit or a JSL, the Ministry POI limit or JSL should be used. Only the remaining contaminants should be considered to be listed on Table B-2B.

Since the Facility is located in a rural setting as defined in the Air Dispersion Modelling Guideline of Ontario (ADMGO) the rural dispersion factors in Table B-1 of the Ministry Procedure were used.

The distance screening exercise was only performed for contaminants emitted from the kiln stack only and that have an hourly and/or 24-hour standard. Emissions of common contaminants including contaminants with an annual standard were assessed and modelled as significant contaminants as presented in Section 2.2.5.2 of this report.

For the kiln stack source, the shortest distance between the point of emission and the property line was determined. For each contaminant, the source of emission closest to the property line was identified and the distance applied to the site-wide emissions of that contaminant (minus the negligible sources) and the relevant dispersion factor applied.

The 1-hr dispersion factors provided in Table B-1 of the Ministry Procedure were converted to the appropriate averaging periods used in modelling using the following equation as provided in Table 7-1 of the Ministry Procedure:

$$C_0 = C_1 \text{ x } (t_1/t_0)^{0.28}$$

Where,

C_0 = the concentration at the averaging period t_0

C_1 = the concentration at the averaging period t_1

The contaminants that are considered to be emitted in negligible amount using the screening procedure described above are summarized in Table E-2-1.

Table E-2-2: Assessment of Significance - Ministry Procedure Section 7.1.2 - 24 hour

Dispersion Factor: rural

Source Description	Contaminant Name	CAS #	Sig or Neg (final result)	Source for Emission Threshold (ET) Value	Emission Threshold Value (µg/m^3) (24-hr)	Averaging Period (hr)	Raw Source Emission Rate (ER)* (g/s)	Shortest Distance to Property Line by Source (m)	Shortest Distance to Property Line by CAS# (m)	Table B-1 Distance Below Shortest Distance (m)	Table B-1 Dispersion Factor Below Shortest Distance (1-hr) (µg/m^3 per g/s)	Table B-1 Distance Above Shortest Distance (m)	Table B-1 Dispersion Factor Above Shortest Distance (1-hr) (µg/m^3 per g/s)	Interpolated Dispersion Factor to 1m (1-hr) (µg/m^3 per g/s)	Applicable Dispersion Factor (averaging period) (µg/m^3 per g/s)	Emission Threshold Emission Rate (g/s)	Site ER % of Emission Threshold ER	Sig or Neg (based on ET)	Source ER after ET Screening (g/s)
Kiln	**Ammonia**																		
Kiln	Ammonia	7664-41-7	sig	Ministry POI	100	24	5.95E+00	341	341	300	1900	350	1700	1736	694.4	7.20E-02	>1000%	sig	5.95E+00
Kiln	**Hydrogen Chloride**																		
Kiln	Hydrochloric Acid	7647-01-0	sig	Ministry POI	20	24	1.67E+00	341	341	300	1900	350	1700	1736	694.4	1.44E-02	>1000%	sig	1.67E+00
Kiln	**Metals and Metal Oxides**																		
Kiln	Aluminum	7429-90-5	sig	JSL	12	24	6.07E-02	341	341	300	1900	350	1700	1736	694.4	8.64E-03	703%	sig	6.07E-02
Kiln	Aluminum Oxide	1344-28-1	sig	Guideline	120	24	1.15E-01	341	341	300	1900	350	1700	1736	694.4	8.64E-02	133%	sig	1.15E-01
Kiln	Boron	7440-42-8	neg	Ministry POI	120	24	5.30E-03	341	341	300	1900	350	1700	1736	694.4	8.64E-02	6%	neg	0.00E+00
Kiln	Calcium Oxide	1305-78-8	sig	Ministry POI	10	24	9.69E-01	341	341	300	1900	350	1700	1736	694.4	7.20E-03	>1000%	sig	9.69E-01
Kiln	Copper	7440-50-8	neg	Ministry POI	50	24	3.73E-04	341	341	300	1900	350	1700	1736	694.4	3.60E-02	1%	neg	0.00E+00
Kiln	Iron	7439-89-6	sig	Ministry POI	4	24	4.56E-02	341	341	300	1900	350	1700	1736	694.4	2.88E-03	>1000%	sig	4.56E-02
Kiln	Magnesium	7439-95-4	neg	JSL	72	24	3.01E-02	341	341	300	1900	350	1700	1736	694.4	5.18E-02	58%	neg	0.00E+00
Kiln	Magnesium Oxide	1309-48-4	neg	Ministry POI	120	24	4.99E-02	341	341	300	1900	350	1700	1736	694.4	8.64E-02	58%	neg	0.00E+00
Kiln	Molybdenum	7439-98-7	neg	Guideline	120	24	1.03E-03	341	341	300	1900	350	1700	1736	694.4	8.64E-02	1%	neg	0.00E+00
Kiln	Phosphorus	7723-14-0	sig	JSL	0.5	24	1.61E-02	341	341	300	1900	350	1700	1736	694.4	3.60E-04	>1000%	sig	1.61E-02
Kiln	Potassium	7440-09-7	sig	JSL	1	24	1.07E-01	341	341	300	1900	350	1700	1736	694.4	7.20E-04	>1000%	sig	1.07E-01
Kiln	Strontium	7440-24-6	neg	Guideline	120	24	1.39E-03	341	341	300	1900	350	1700	1736	694.4	8.64E-02	2%	neg	0.00E+00
Kiln	Thallium	7440-28-0	neg	JSL	0.5	24	4.20E-05	341	341	300	1900	350	1700	1736	694.4	3.60E-04	12%	neg	0.00E+00
Kiln	Titanium	7440-32-6	neg	Ministry POI	120	24	3.68E-03	341	341	300	1900	350	1700	1736	694.4	8.64E-02	4%	neg	0.00E+00
Kiln	Zinc	7440-66-6	neg	Ministry POI	120	24	2.82E-03	341	341	300	1900	350	1700	1736	694.4	8.64E-02	3%	neg	0.00E+00
Kiln	**Volatile Organic Matter**																		
Kiln	Acetone (2-Propanone)	67-64-1	neg	Ministry POI	11880	24	1.23E-01	341	341	300	1900	350	1700	1736	694.4	8.55E+00	1%	neg	0.00E+00
Kiln	Bromodichloromethane	75-27-4	neg	JSL	350	24	1.66E-04	341	341	300	1900	350	1700	1736	694.4	2.52E-01	<1%	neg	0.00E+00
Kiln	Bromoform	75-25-2	neg	Guideline	55	24	2.11E-04	341	341	300	1900	350	1700	1736	694.4	3.96E-02	<1%	neg	0.00E+00
Kiln	Bromomethane	74-83-9	neg	Guideline	1350	24	1.11E-02	341	341	300	1900	350	1700	1736	694.4	9.72E-01	1%	neg	0.00E+00
Kiln	Methyl Ethyl Ketone (2-Butanone)	78-93-3	neg	Ministry POI	1000	24	5.43E-04	341	341	300	1900	350	1700	1736	694.4	7.20E-01	<1%	neg	0.00E+00
Kiln	Carbon Tetrachloride	56-23-5	neg	Ministry POI	2.4	24	2.41E-04	341	341	300	1900	350	1700	1736	694.4	1.73E-03	14%	neg	0.00E+00
Kiln	Chloroethane	75-00-3	neg	Ministry POI	5600	24	8.90E-03	341	341	300	1900	350	1700	1736	694.4	4.03E+00	<1%	neg	0.00E+00
Kiln	Chloroform	67-66-3	neg	Ministry POI	1	24	1.66E-04	341	341	300	1900	350	1700	1736	694.4	7.20E-04	23%	neg	0.00E+00
Kiln	Chloromethane	74-87-3	neg	Ministry POI	320	24	1.02E-01	341	341	300	1900	350	1700	1736	694.4	2.30E-01	44%	neg	0.00E+00
Kiln	Cumene	98-82-8	neg	Ministry POI	400	24	6.41E-02	341	341	300	1900	350	1700	1736	694.4	2.88E-01	22%	neg	0.00E+00
Kiln	Dibromochloromethane	124-48-1	neg	JSL	0.2	24	1.36E-04	341	341	300	1900	350	1700	1736	694.4	1.44E-04	94%	neg	0.00E+00
Kiln	1,1-Dichloroethane	75-34-3	neg	Ministry POI	165	24	1.81E-04	341	341	300	1900	350	1700	1736	694.4	1.19E-01	<1%	neg	0.00E+00
Kiln	1,2-Dichloroethane	107-06-2	neg	Ministry POI	2	24	1.06E-04	341	341	300	1900	350	1700	1736	694.4	1.44E-03	7%	neg	0.00E+00
Kiln	1,1-Dichloroethylene	75-35-4	neg	Ministry POI	10	24	1.66E-04	341	341	300	1900	350	1700	1736	694.4	7.20E-03	2%	neg	0.00E+00
Kiln	cis-1,2-Dichloroethylene	156-59-2	neg	Guideline	105	24	1.51E-04	341	341	300	1900	350	1700	1736	694.4	7.56E-02	<1%	neg	0.00E+00
Kiln	trans-1,2-Dichloroethylene	156-60-5	neg	Guideline	105	24	1.51E-04	341	341	300	1900	350	1700	1736	694.4	7.56E-02	<1%	neg	0.00E+00
Kiln	1,2-Dichloropropane	78-87-5	neg	Guideline	2400	24	1.66E-04	341	341	300	1900	350	1700	1736	694.4	1.73E+00	<1%	neg	0.00E+00
Kiln	Ethylene Dibromide	106-93-4	neg	Guideline	3	24	1.51E-04	341	341	300	1900	350	1700	1736	694.4	2.16E-03	7%	neg	0.00E+00
Kiln	Methylene Chloride(Dichloromethane)	75-09-2	neg	Ministry POI	220	24	2.87E-04	341	341	300	1900	350	1700	1736	694.4	1.58E-01	<1%	neg	0.00E+00
Kiln	Styrene	100-42-5	neg	Ministry POI	400	24	3.97E-02	341	341	300	1900	350	1700	1736	694.4	2.88E-01	14%	neg	0.00E+00
Kiln	1,1,1,2-Tetrachloroethane	630-20-6	neg	JSL	0.5	24	1.51E-04	341	341	300	1900	350	1700	1736	694.4	3.60E-04	42%	neg	0.00E+00
Kiln	1,1,2,2-Tetrachloroethane	79-34-5	sig	JSL	0.1	24	2.11E-04	341	341	300	1900	350	1700	1736	694.4	7.20E-05	293%	sig	2.11E-04
Kiln	Tetrachloroethylene	127-18-4	neg	Ministry POI	360	24	2.72E-04	341	341	300	1900	350	1700	1736	694.4	2.59E-01	<1%	neg	0.00E+00
Kiln	1,1,1-Trichloroethane	71-55-6	neg	Ministry POI	115000	24	2.11E-04	341	341	300	1900	350	1700	1736	694.4	8.28E+01	<1%	neg	0.00E+00
Kiln	1,1,2-Trichloroethane	79-00-5	sig	JSL	0.3	24	2.41E-04	341	341	300	1900	350	1700	1736	694.4	2.16E-04	112%	sig	2.41E-04
Kiln	Trichloroethylene	79-01-6	neg	Ministry POI	12	24	1.66E-04	341	341	300	1900	350	1700	1736	694.4	8.64E-03	2%	neg	0.00E+00
Kiln	Toluene	108-88-3	neg	Guideline	2000	24	2.08E-01	341	341	300	1900	350	1700	1736	694.4	1.44E+00	14%	neg	0.00E+00
Kiln	Vinyl Chloride	75-01-4	neg	Ministry POI	1	24	7.03E-04	341	341	300	1900	350	1700	1736	694.4	7.20E-04	98%	neg	0.00E+00
Kiln	**Dioxins, Furans and Dioxin-like PCBs**																		
Kiln	Dioxins, Furans and Dioxin-like PCBs	CDD	neg	No POI, JSL or B-2B	0.1	24	2.74E-09	341	341	300	1900	350	1700	1736	694.4	7.20E-05	<1%	neg	0.00E+00
Kiln	**Polycyclic Aromatic Hydrocarbons (PAHs)**																		
Kiln	Acenaphthene	83-32-9	sig	No POI, JSL or B-2B	0.1	24	4.51E-04	341	341	300	1900	350	1700	1736	694.4	7.20E-05	626%	sig	4.51E-04
Kiln	Acenaphthylene	208-96-8	sig	No POI, JSL or B-2B	0.1	24	7.60E-04	341	341	300	1900	350	1700	1736	694.4	7.20E-05	>1000%	sig	7.60E-04
Kiln	Anthracene	120-12-7	neg	No POI, JSL or B-2B	0.1	24	4.20E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	58%	neg	0.00E+00
Kiln	Benzo(a)anthracene	56-55-3	neg	No POI, JSL or B-2B	0.1	24	2.18E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	30%	neg	0.00E+00
Kiln	Benzo(b)fluoranthene	205-99-2	neg	No POI, JSL or B-2B	0.1	24	2.18E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	30%	neg	0.00E+00
Kiln	Benzo(k)fluoranthene	207-08-9	neg	No POI, JSL or B-2B	0.1	24	2.18E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	30%	neg	0.00E+00
Kiln	Benzo(a)fluorene	238-84-6	neg	No POI, JSL or B-2B	0.1	24	2.18E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	30%	neg	0.00E+00
Kiln	Benzo(b)fluorene	30777-19-6	neg	No POI, JSL or B-2B	0.1	24	2.18E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	30%	neg	0.00E+00
Kiln	Benzo(g,h,i)perylene	191-24-2	neg	No POI, JSL or B-2B	0.1	24	2.18E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	30%	neg	0.00E+00
Kiln	Benzo(e)pyrene	192-97-2	neg	No POI, JSL or B-2B	0.1	24	2.18E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	30%	neg	0.00E+00
Kiln	2-Chloronaphthalene	91-58-7	neg	JSL	1	24	3.94E-04	341	341	300	1900	350	1700	1736	694.4	7.20E-04	55%	neg	0.00E+00

Table E-2-2: Assessment of Significance - Ministry Procedure Section 7.1.2 - 24 hour

Dispersion Factor: rural

Source Description	Contaminant Name	CAS #	Sig or Neg (final result)	Source for Emission Threshold (ET) Value	Emission Threshold Value ($\mu g/m^3$) (24-hr)	Averaging Period (hr)	Raw Source Emission Rate (ER)* (g/s)	Shortest Distance to Property Line by Source (m)	Shortest Distance to Property Line by CAS# (m)	Table B-1 Distance Below Shortest Distance (m)	Table B-1 Dispersion Factor Below Shortest Distance (1-hr) ($\mu g/m^3$ per g/s)	Table B-1 Distance Above Shortest Distance (m)	Table B-1 Dispersion Factor Above Shortest Distance (1-hr) ($\mu g/m^3$ per g/s)	Interpolated Dispersion Factor to 1m (1-hr) ($\mu g/m^3$ per g/s)	Applicable Dispersion Factor (averaging period) ($\mu g/m^3$ per g/s)	Emission Threshold Emission Rate (g/s)	Site ER % of Emission Threshold ER	Sig or Neg (based on ET)	Source ER after ET Screening (g/s)
Kiln	Chrysene	218-01-9	neg	No POI, JSL or B-2B	0.1	24	2.18E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	30%	neg	0.00E+00
Kiln	Coronene	191-07-1	neg	No POI, JSL or B-2B	0.1	24	2.18E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	30%	neg	0.00E+00
Kiln	Dibenzo(a,c)anthracene	215-58-7	neg	No POI, JSL or B-2B	0.1	24	2.18E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	30%	neg	0.00E+00
Kiln	9,10-Dimethylanthracene	781-43-1	neg	No POI, JSL or B-2B	0.1	24	2.18E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	30%	neg	0.00E+00
Kiln	7,12-Dimethylbenzo(a)anthracene	57-97-6	sig	No POI, JSL or B-2B	0.1	24	8.70E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	121%	sig	8.70E-05
Kiln	Fluoranthene	206-44-0	neg	No POI, JSL or B-2B	0.1	24	2.18E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	30%	neg	0.00E+00
Kiln	Fluorene	86-73-7	sig	No POI, JSL or B-2B	0.1	24	2.15E-04	341	341	300	1900	350	1700	1736	694.4	7.20E-05	299%	sig	2.15E-04
Kiln	Indeno(1,2,3-cd)pyrene	193-39-5	neg	No POI, JSL or B-2B	0.1	24	2.18E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	30%	neg	0.00E+00
Kiln	2-Methylanthracene	613-12-7	neg	No POI, JSL or B-2B	0.1	24	2.18E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	30%	neg	0.00E+00
Kiln	3-Methylcholanthrene	56-49-5	neg	No POI, JSL or B-2B	0.1	24	2.18E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	30%	neg	0.00E+00
Kiln	1-Methylnaphthalene	90-12-0	neg	JSL	35.5	24	2.27E-02	341	341	300	1900	350	1700	1736	694.4	2.56E-02	89%	neg	0.00E+00
Kiln	2-Methylnaphthalene	91-57-6	sig	No POI, JSL or B-2B	0.1	24	3.34E-02	341	341	300	1900	350	1700	1736	694.4	7.20E-05	>1000%	sig	3.34E-02
Kiln	1-Methylphenanthrene	832-69-9	neg	No POI, JSL or B-2B	0.1	24	7.10E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	99%	neg	0.00E+00
Kiln	9-methylphenanthrene	883-20-5	sig	No POI, JSL or B-2B	0.1	24	1.71E-04	341	341	300	1900	350	1700	1736	694.4	7.20E-05	237%	sig	1.71E-04
Kiln	Naphthalene	91-20-3	sig	Guideline	22.5	24	5.42E-02	341	341	300	1900	350	1700	1736	694.4	1.62E-02	335%	sig	5.42E-02
Kiln	Perylene	198-55-0	neg	No POI, JSL or B-2B	0.1	24	2.18E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	30%	neg	0.00E+00
Kiln	Phenanthrene	85-01-8	sig	No POI, JSL or B-2B	0.1	24	9.19E-04	341	341	300	1900	350	1700	1736	694.4	7.20E-05	>1000%	sig	9.19E-04
Kiln	Picene	213-46-7	neg	No POI, JSL or B-2B	0.1	24	2.18E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	30%	neg	0.00E+00
Kiln	Pyrene	129-00-0	neg	No POI, JSL or B-2B	0.1	24	2.18E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	30%	neg	0.00E+00
Kiln	Tetralin	119-64-2	neg	JSL	151.5	24	1.41E-02	341	341	300	1900	350	1700	1736	694.4	1.09E-01	13%	neg	0.00E+00
Kiln	Triphenylene	217-59-4	neg	No POI, JSL or B-2B	0.1	24	2.18E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	30%	neg	0.00E+00
Kiln	**Chloronated Organics**																		
Kiln	1,3-Dichlorobenzene	541-73-1	neg	JSL	50	24	2.54E-04	341	341	300	1900	350	1700	1736	694.4	3.60E-02	<1%	neg	0.00E+00
Kiln	1,4-Dichlorobenzene	106-46-7	neg	Ministry POI	95	24	2.69E-04	341	341	300	1900	350	1700	1736	694.4	6.84E-02	<1%	neg	0.00E+00
Kiln	1,2,3-Trichlorobenzene	87-61-6	neg	JSL	135	24	1.94E-04	341	341	300	1900	350	1700	1736	694.4	9.72E-02	<1%	neg	0.00E+00
Kiln	1,2,4-Trichlorobenzene	120-82-1	neg	Guideline	400	24	1.82E-04	341	341	300	1900	350	1700	1736	694.4	2.88E-01	<1%	neg	0.00E+00
Kiln	1,3,5-Trichlorobenzene	108-70-3	neg	JSL	3.6	24	2.39E-05	341	341	300	1900	350	1700	1736	694.4	2.59E-03	<1%	neg	0.00E+00
Kiln	1,2,3,4-Tetrachlorobenzene	634-66-2	neg	JSL	600	24	2.18E-05	341	341	300	1900	350	1700	1736	694.4	4.32E-01	<1%	neg	0.00E+00
Kiln	1,2,3,5+1,2,4,5-Tetrachlorobenzene	634-90-2 / 95-94-3	neg	No POI, JSL or B-2B	0.1	24	2.18E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	30%	neg	0.00E+00
Kiln	Pentachlorobenzene	608-93-5	neg	JSL	80	24	2.20E-05	341	341	300	1900	350	1700	1736	694.4	5.76E-02	<1%	neg	0.00E+00
Kiln	Hexachlorobenzene	118-74-1	sig	JSL	0.011	24	2.18E-05	341	341	300	1900	350	1700	1736	694.4	7.92E-06	275%	sig	2.18E-05
Kiln	2-Chlorophenol	95-57-8	neg	JSL	18	24	1.43E-03	341	341	300	1900	350	1700	1736	694.4	1.30E-02	11%	neg	0.00E+00
Kiln	3-Chlorophenol (m-Chlorophenol)	108-43-0	neg	JSL	15	24	2.13E-04	341	341	300	1900	350	1700	1736	694.4	1.08E-02	2%	neg	0.00E+00
Kiln	4-Chlorophenol (p-Chlorophenol)	106-48-9	neg	JSL	15	24	1.75E-04	341	341	300	1900	350	1700	1736	694.4	1.08E-02	2%	neg	0.00E+00
Kiln	2,3-Dichlorophenol	576-24-9	neg	No POI, JSL or B-2B	0.1	24	6.52E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	91%	neg	0.00E+00
Kiln	2,4 + 2,5-Dichlorophenol	120-83-2 / 583-78-8	sig	No POI, JSL or B-2B	0.1	24	7.48E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	104%	sig	7.48E-05
Kiln	2,6-Dichlorophenol	87-65-0	neg	JSL	19	24	6.52E-05	341	341	300	1900	350	1700	1736	694.4	1.37E-02	<1%	neg	0.00E+00
Kiln	3,4-Dichlorophenol	95-77-2	neg	No POI, JSL or B-2B	0.1	24	6.52E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	91%	neg	0.00E+00
Kiln	3,5-Dichlorophenol	591-35-5	neg	No POI, JSL or B-2B	0.1	24	6.52E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	91%	neg	0.00E+00
Kiln	2,3,4-Trichlorophenol	15950-66-0	neg	No POI, JSL or B-2B	0.1	24	6.52E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	91%	neg	0.00E+00
Kiln	2,3,5-Trichlorophenol	933-78-8	neg	No POI, JSL or B-2B	0.1	24	6.50E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	90%	neg	0.00E+00
Kiln	2,3,6-Trichlorophenol	933-75-5	neg	No POI, JSL or B-2B	0.1	24	6.52E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	91%	neg	0.00E+00
Kiln	2,4,5-Trichlorophenol	95-95-4	neg	JSL	220	24	6.52E-05	341	341	300	1900	350	1700	1736	694.4	1.58E-01	<1%	neg	0.00E+00
Kiln	2,4,6-Trichlorophenol	88-06-2	neg	JSL	1.5	24	6.52E-05	341	341	300	1900	350	1700	1736	694.4	1.08E-03	6%	neg	0.00E+00
Kiln	3,4,5-Trichlorophenol	609-19-8	neg	No POI, JSL or B-2B	0.1	24	6.52E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	91%	neg	0.00E+00
Kiln	2,3,4,5-Tetrachlorophenol	4901-51-3	neg	No POI, JSL or B-2B	0.1	24	6.50E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	90%	neg	0.00E+00
Kiln	2,3,4,6-Tetrachlorophenol	58-90-2	neg	JSL	0.75	24	6.50E-05	341	341	300	1900	350	1700	1736	694.4	5.40E-04	12%	neg	0.00E+00
Kiln	2,3,5,6-Tetrachlorophenol	935-95-5	neg	No POI, JSL or B-2B	0.1	24	6.50E-05	341	341	300	1900	350	1700	1736	694.4	7.20E-05	90%	neg	0.00E+00
Kiln	Pentachlorophenol	87-86-5	neg	Guideline	20	24	6.52E-05	341	341	300	1900	350	1700	1736	694.4	1.44E-02	<1%	neg	0.00E+00

* Maximum emission rate for all scenarios

Table E-2-2: Assessment of Significance - Ministry Procedure Section 7.1.2 - 1 hour

Dispersion Factor: rural

Source Description	Contaminant Name	CAS #	Sig or Neg (final result)	Source for Emission Threshold (ET) Value	Emission Threshold Value (µg/m^3) (1-hr)	Averaging Period (hr)	Raw Source Emission Rate (ER) (g/s) *	Shortest Distance to Property Line by Source (m)	Shortest Distance to Property Line by CAS# (m)	Table B-1 Distance Below Shortest Distance (m)	Table B-1 Dispersion Factor Below Shortest Distance (1-hr) (µg/m^3 per g/s)	Table B-1 Distance Above Shortest Distance (m)	Table B-1 Dispersion Factor Above Shortest Distance (1-hr) (µg/m^3 per g/s)	Interpolated Dispersion Factor to 1m (1-hr) (µg/m^3 per g/s)	Applicable Dispersion Factor (averaging period) (µg/m^3 per g/s)	Emission Threshold Emission Rate (g/s)	Site ER % of Emission Threshold ER	Sig or Neg (based on ET)
Kiln	Chlorobenzene	108-90-7	neg	Guideline	3500	1	8.25E-03	341	341	300	1900	350	1700	1736	1736	1.01E+00	<1%	neg
Kiln	1,2-Dichlorobenzene	95-50-1	neg	Guideline	30500	1	5.00E-04	341	341	300	1900	350	1700	1736	1736	8.78E+00	<1%	neg

* Maximum emission rate for all scenarios

Appendix E-3

Air Dispersion Modelling Set Up

Appendix E-3: Air Dispersion Modelling Set Up

Air dispersion modelling for all contaminants emitted from the facility under the baseline, alternative fuel substitution and post baseline operating conditions was undertaken using the US EPA AERMOD modelling system (AERMOD Version 16216r) and site-specific meteorological data provided by the Ministry.

This model was set up to calculate maximum hourly concentrations, which can be used to provide maximum 1-hour, 24-hour, 30-day, and annual average concentrations using local meteorological data.

AERMOD is a Ministry approved steady-state Gaussian plume dispersion model that can be used to assess pollutant concentrations from a wide variety of complex industrial settings including multiple stacks, fugitive emissions, and building wake effects. The AERMOD modelling system was developed by the AMS/EPA Regulatory Model Improvement Committee (AERMIC), and consists of two pre-processors (AERMET and AERMAP) and the dispersion model, AERMOD.

AERMET is a general purpose meteorological pre-processor which uses surface and upper air meteorological conditions together with surface characteristics to calculate the boundary layer parameters needed by AERMOD. AERMAP is the terrain pre-processor used to calculate a representative terrain-influenced height associated with each receptor within the modelling domain.

<u>AERMOD Meteorology</u>

The following site-specific hourly surface and upper air meteorological data files processed and provided by the Ministry were used for the AERMOD dispersion model:

- StMary'sCementPlant_Bowmanville_16216.SFC; and
- StMary'sCementPlant_Bowmanville_16216.PFL.

The wind rose also shows the distribution of wind directions and wind speeds from the surface data as Figure E-2-1.

<u>Terrain Data</u>

The terrain data used, Tile 92, Bowmanville, Datum NAD83, UTM Zone 17, was downloaded from Ontario Digital Elevation Model Data on the Ministry’s website.

<u>Modelling Domain and Receptor Grid</u>

The model was based on a receptor grid entered in the site and extended out approximately 1 km from the property line in all directions. A tiered grid was used for receptor placements and was created based upon the receptor spacing guidelines in the *Ministry’s Air Dispersion Modelling Guideline for Ontario (February 2017)*.

Building Downwash

The onsite primary stacks including the kiln stack were modelled as point sources. As such building downwash has been considered in the modelling exercise.

Table E-3-2 AERMOD Modelling Physical Source Parameters

Source ID	Description	Contaminants	Type of Source	X Coordinate	Y Coordinate	Base Elevation [2]	Stack Release Height	Stack Exit Temperature	Exit Flow Rate	Stack Inner Diameter	
				m	m	m	m	K	m^3/s	m	
KILN7	Kiln Stack	PM, Metals, NOx, SO2, CO, PAHs, D&Fs, HCl, NH3	Point	487866.1	4787702.4	311.92	57.2	440	104.95	2.4	
CLYST	Clay Dryer Stack	PM, Metals, NOx	Point	487869.5	4787573.6	314.21	9.7	421	37.75	1.5	
FUEL	Fuel silo baghouse	PM, Metals	Point	487846.2	4787576.4	314.12	15	313	8.97	2	
CBH	Clinker cooler baghouse	PM, Metals	Point	487842.67	4787600.8	313.31	25	432	61.075	2.3	
BAML	Finish mill baghouses	PM, Metals	Point	487904.4	4787802.7	309.58	14	373	62.78	2	
Source ID	**Description**	**Contaminants**	**Type of Source**	**X Coordinate**	**Y Coordinate**	**Base Elevation [2]**	**Release Height Above Grade**	**Length of Side**	**Initial Lateral Dimension**	**Initial Vertical Dimension [1]**	
				m	m	m	m	m	m	m	
RAWS	Raw material silo baghouses	PM, Metals	Volume	487844.5	4787804.9	308.99	18	15.91	3.70	8.4	
HSILOS	Homogenizing silo baghouses	PM, Metals	Volume	487846.6	4787713.0	311.31	9.4	30.1	7.00	4.4	
BLSI	Silo baghouses next to the finish mill	PM, Metals	Volume	487953.8	4787831.5	308.16	3	9.89	2.30	1.4	
S200	200 Series cement silo baghouses	PM, Metals	Volume	487976.6	4787994.9	305	45	21.07	4.90	21	
S340	300 and 400 series cement silo baghouses	PM, Metals	Volume	487928.6	4787982.0	305.29	40	28.81	6.70	18.6	
S500	500 serios cement silo baghouses	PM, Metals	Volume	487980.9	4787965.3	305	27	8.6	2.00	12.6	
PACK	Packhouse baghouses	PM, Metals	Volume	487909.9	4787954.3	305	18.9	21.5	0.50	8.8	
K1P51	Baghouse K1P51	PM, Metals	Volume	487865.8	4787606.8	313.28	28	18	4.19	8.8	
FSSC	Foundry sand screening operations	PM, Metals	Volume	488341.9	4787421.1	319.34	6	40	9.30	2.79	
CBBOI	Boiler	PM, NOx, SO2, CO	Volume	488127.5	4788009.6	305	10	12.04	2.80	4.7	
JCBOI	Boiler	PM, NOx, SO2, CO	Volume	488170.6	4788118.0	305	10	18.06	4.20	4.7	
TRBOI	Boiler	PM, NOx, SO2, CO	Volume	488084.4	4788068.5	305	15	30.1	7.00	7	
Source ID	**Description**	**Contaminants**	**Type of Source**	**X Coordinate**	**Y Coordinate**	**Base Elevation**	**Release Height**	**Length of the X side**	**Length of the Y side**	**Orientation Angle from the North**	
				m	m	-	m	m	m	°	
CLPT	Clay pit	PM, Metals	Area	487895.60	4786501.80	323.94	2	45.4	91	90	
Source ID	**Description**	**Contaminants**	**Type of Source**	**X Coordinate**	**Y Coordinate**	**Base Elevation**	**Release Height**	**Length of the X side**	**Length of the Y side**	**Volume of the Open Pit**	**Orientation Angle from the North**
				m	m	-	m	m	m	m^3	°
PIT11	Former quarry area	PM, Metals, NOx, SO2, CO	Open Pit	487544.40	4787915.88	305	3	333	567	4,603,392	95

1. All sources are elevated (release height>0).
2. Base elevations were extracted from AERMAP Output file.

Table E-3-3A AERMOD Modelling Source Emission Summary – Baseline Average

Source ID	Emission Rate (g/s)																				
	TSP	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Ferric Oxide	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Tin	Vanadium	NOx	SO2	CO	Kiln Stack Unit Emission
KILN7	7.20E-01	3.25E-05	3.25E-05	3.10E-04	8.00E-06	3.60E-05	5.15E-05	1.80E-05	1.35E-02	9.70E-04	9.65E-04	1.25E-03	9.45E-05	3.35E-04	1.75E-05	1.80E-04	1.90E-04	4.05E+01	6.60E+00	9.05E+01	1.00E+00
CLYST	3.78E-01	2.64E-07	1.13E-06	3.70E-05	1.81E-07	9.82E-08	1.06E-05	3.32E-06	1.13E-02	6.04E-06	2.08E-04	3.78E-08	9.44E-06	1.40E-06	1.17E-07	9.44E-06	8.68E-06	4.81E-01	-	-	-
FUEL	8.97E-02	1.44E-07	3.86E-07	4.75E-06	8.25E-08	3.59E-08	3.59E-06	5.38E-07	3.59E-03	2.15E-06	8.16E-05	8.97E-09	1.79E-05	2.15E-07	3.59E-08	4.13E-07	4.75E-05	-	-	-	-
CBH	6.11E-01	1.26E-06	6.29E-06	2.75E-04	9.37E-07	6.89E-07	1.99E-05	8.15E-06	2.09E-02	2.68E-05	3.03E-04	1.38E-07	2.54E-05	2.37E-06	1.04E-06	3.98E-06	3.52E-05	-	-	-	-
BAML	1.28E+00	2.58E-06	1.34E-05	5.37E-04	1.84E-06	1.36E-06	3.87E-05	1.59E-05	4.06E-02	5.20E-05	6.02E-04	5.23E-07	5.01E-05	4.75E-06	2.03E-06	7.78E-06	6.85E-05	-	-	-	-
RAWS	4.25E-02	8.78E-08	4.40E-07	1.93E-05	6.54E-08	4.82E-08	1.38E-06	5.70E-07	1.45E-03	1.87E-06	2.09E-05	9.64E-09	1.70E-06	1.65E-07	7.26E-08	2.78E-07	2.24E-06	-	-	-	-
HSILOS	2.10E-02	4.34E-08	2.17E-07	9.54E-06	3.23E-08	2.38E-08	6.82E-07	2.82E-07	7.16E-04	9.25E-07	1.03E-05	4.76E-09	8.41E-07	8.16E-08	3.59E-08	1.37E-07	1.11E-06	-	-	-	-
BLSI	1.21E-01	2.56E-07	2.69E-06	1.07E-04	3.50E-07	1.09E-07	3.92E-06	1.70E-06	4.21E-03	4.38E-06	3.89E-05	1.76E-07	4.48E-06	8.13E-07	1.27E-07	6.19E-07	9.07E-06	-	-	-	-
S200	4.44E-02	8.94E-08	4.64E-07	1.86E-05	6.36E-08	4.69E-08	1.34E-06	5.49E-07	1.40E-03	1.80E-06	2.08E-05	1.81E-08	1.73E-06	1.64E-07	7.01E-08	2.69E-07	2.37E-06	-	-	-	-
S340	9.57E-02	1.93E-07	1.00E-06	4.00E-05	1.37E-07	1.01E-07	2.89E-06	1.18E-06	3.03E-03	3.88E-06	4.49E-05	3.90E-08	3.74E-06	3.54E-07	1.51E-07	5.80E-07	5.11E-06	-	-	-	-
S500	1.69E-01	3.40E-07	1.76E-06	7.06E-05	2.42E-07	1.78E-07	5.09E-06	2.09E-06	5.34E-03	6.84E-06	7.92E-05	6.88E-08	6.59E-06	6.24E-07	2.66E-07	1.02E-06	9.00E-06	-	-	-	-
PACK	1.40E-01	2.83E-07	1.47E-06	5.87E-05	2.01E-07	1.48E-07	4.24E-06	1.74E-06	4.44E-03	5.69E-06	6.59E-05	5.72E-08	5.48E-06	5.19E-07	2.22E-07	8.51E-07	7.49E-06	8.66E-03	-	-	-
K1P51	2.80E-02	4.48E-08	1.20E-07	1.48E-06	2.58E-08	1.12E-08	1.12E-06	1.68E-07	1.12E-03	6.72E-07	2.55E-05	2.80E-09	5.60E-06	6.72E-08	1.12E-08	1.29E-07	1.48E-05	-	-	-	-
PIT11	1.04E+00	1.97E-06	8.14E-06	3.22E-04	1.22E-06	9.23E-07	2.47E-05	1.01E-05	2.65E-02	3.22E-05	4.58E-04	1.98E-07	3.86E-05	3.27E-06	1.32E-06	5.02E-06	5.73E-05	4.55E-02	1.61E-01	1.14E-02	-
CLPT	1.69E-02	1.18E-08	5.08E-08	1.66E-06	8.12E-09	4.40E-09	4.74E-07	1.49E-07	5.08E-04	2.71E-07	9.31E-06	1.69E-09	4.23E-07	6.26E-08	5.25E-09	4.23E-07	3.89E-07	-	-	-	-
FSSC	3.25E-01	9.15E-07	4.88E-06	2.81E-04	1.55E-07	7.32E-07	4.70E-05	2.44E-05	3.44E-02	2.87E-05	2.10E-04	3.05E-08	7.01E-05	6.40E-07	3.96E-06	1.13E-05	5.79E-05	3.88E-01	2.57E-02	8.37E-02	-
CBBOI	5.00E-03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.03E-02	1.08E-01	7.58E-03	-
JCBOI	1.67E-03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.06E-02	3.59E-02	2.53E-03	-
TRBOI	5.00E-03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.33E-02	1.08E-01	7.58E-03	-

NOTES:
(1) Emissions of PAHs, D&F, VOCs, HCl and NH3 from the kiln stack are modelled using unit emission rate and the corresponding POI concentrations were prorated based on the unit emission dispersion modelling multiplier.

Table E-3-3B AERMOD Modelling Source Emission Summary – Alternative Fuel Substitution

Source ID	Emission Rate (g/s)																			
	TSP	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Ferric Oxide	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Tin	Vanadium	NOx	SO2	CO	Kiln Stack Unit Emission
KILN7	5.80E-01	3.20E-05	3.20E-05	2.70E-04	8.00E-06	3.70E-05	3.90E-05	1.60E-05	1.00E-02	7.00E-04	6.40E-03	9.30E-04	8.80E-05	3.70E-04	1.60E-05	2.00E-04	1.20E-04	4.30E+01	7.50E+00	9.60E+01	1.00E+00
CLYST	3.78E-01	2.64E-07	1.13E-06	3.70E-05	1.81E-07	9.82E-08	1.06E-05	3.32E-06	1.13E-02	6.04E-06	2.08E-04	3.78E-08	9.44E-06	1.40E-06	1.17E-07	9.44E-06	8.68E-06	4.81E-01	-	-	-
FUEL	8.97E-02	1.44E-07	3.86E-07	4.75E-06	8.25E-08	3.59E-08	3.59E-06	5.38E-07	3.59E-03	2.15E-06	8.16E-05	8.97E-09	1.79E-05	2.15E-07	3.59E-08	4.13E-07	4.75E-05	-	-	-	-
CBH	6.11E-01	1.26E-06	6.29E-06	2.75E-04	9.37E-07	6.89E-07	1.99E-05	8.15E-06	2.09E-02	2.68E-05	3.03E-04	1.38E-07	2.54E-05	2.37E-06	1.04E-06	3.98E-06	3.52E-05	-	-	-	-
BAML	1.28E+00	2.58E-06	1.34E-05	5.37E-04	1.84E-06	1.36E-06	3.87E-05	1.59E-05	4.06E-02	5.20E-05	6.02E-04	5.23E-07	5.01E-05	4.75E-06	2.03E-06	7.78E-06	6.85E-05	-	-	-	-
RAWS	4.25E-02	8.78E-08	4.40E-07	1.93E-05	6.54E-08	4.82E-08	1.38E-06	5.70E-07	1.45E-03	1.87E-06	2.09E-05	9.64E-09	1.70E-06	1.65E-07	7.26E-08	2.78E-07	2.24E-06	-	-	-	-
HSILOS	2.10E-02	4.34E-08	2.17E-07	9.54E-06	3.23E-08	2.38E-08	6.82E-07	2.82E-07	7.16E-04	9.25E-07	1.03E-05	4.76E-09	8.41E-07	8.16E-08	3.59E-08	1.37E-07	1.11E-06	-	-	-	-
BLSI	1.21E-01	2.56E-07	2.69E-06	1.07E-04	3.50E-07	1.09E-07	3.92E-06	1.70E-06	4.21E-03	4.38E-06	3.89E-05	1.76E-07	4.48E-06	8.13E-07	1.27E-07	6.19E-07	9.07E-06	-	-	-	-
S200	4.44E-02	8.94E-08	4.64E-07	1.86E-05	6.36E-08	4.69E-08	1.34E-06	5.49E-07	1.40E-03	1.80E-06	2.08E-05	1.81E-08	1.73E-06	1.64E-07	7.01E-08	2.69E-07	2.37E-06	-	-	-	-
S340	9.57E-02	1.93E-07	1.00E-06	4.00E-05	1.37E-07	1.01E-07	2.89E-06	1.18E-06	3.03E-03	3.88E-06	4.49E-05	3.90E-08	3.74E-06	3.54E-07	1.51E-07	5.80E-07	5.11E-06	-	-	-	-
S500	1.69E-01	3.40E-07	1.76E-06	7.06E-05	2.42E-07	1.78E-07	5.09E-06	2.09E-06	5.34E-03	6.84E-06	7.92E-05	6.88E-08	6.59E-06	6.24E-07	2.66E-07	1.02E-06	9.00E-06	-	-	-	-
PACK	1.40E-01	2.83E-07	1.47E-06	5.87E-05	2.01E-07	1.48E-07	4.24E-06	1.74E-06	4.44E-03	5.69E-06	6.59E-05	5.72E-08	5.48E-06	5.19E-07	2.22E-07	8.51E-07	7.49E-06	8.66E-03	-	-	-
K1P51	2.80E-02	4.48E-08	1.20E-07	1.48E-06	2.58E-08	1.12E-08	1.12E-06	1.68E-07	1.12E-03	6.72E-07	2.55E-05	2.80E-09	5.60E-06	6.72E-08	1.12E-08	1.29E-07	1.48E-05	-	-	-	-
PIT11	1.04E+00	1.97E-06	8.14E-06	3.22E-04	1.22E-06	9.23E-07	2.47E-05	1.01E-05	2.65E-02	3.22E-05	4.58E-04	1.98E-07	3.86E-05	3.27E-06	1.32E-06	5.02E-06	5.73E-05	4.55E-02	1.61E-01	1.14E-02	-
CLPT	1.69E-02	1.18E-08	5.08E-08	1.66E-06	8.12E-09	4.40E-09	4.74E-07	1.49E-07	5.08E-04	2.71E-07	9.31E-06	1.69E-09	4.23E-07	6.26E-08	5.25E-09	4.23E-07	3.89E-07	-	-	-	-
FSSC	3.25E-01	9.15E-07	4.88E-06	2.81E-04	1.55E-07	7.32E-07	4.70E-05	2.44E-05	3.44E-02	2.87E-05	2.10E-04	3.05E-08	7.01E-05	6.40E-07	3.96E-06	1.13E-05	5.79E-05	3.88E-01	2.57E-02	8.37E-02	-
CBBOI	5.00E-03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.03E-02	1.08E-01	7.58E-03	-
JCBOI	1.67E-03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.06E-02	3.59E-02	2.53E-03	-
TRBOI	5.00E-03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.33E-02	1.08E-01	7.58E-03	-

NOTES:
(1) Emissions of PAHs, D&F, VOCs, HCl and NH3 from the kiln stack are modelled using unit emission rate and the corresponding POI concentrations were prorated based on the unit emission dispersion modelling multiplier.

Appendix F

Assessment of Significant Contaminants and Statistically Significant Change

Table F-1: Assessment of Statistically Significant Change

Contaminant	CAS Number	Averaging Period Emission Rate	Kiln Stack Emission Rate (g/s) Baseline (Oct 2018)	Kiln Stack Emission Rate (g/s) Alt Fuel (Dec 2018)	Kiln Stack Emission Rate (g/s) Post Baseline (Dec 2018)	Are all Emission Rates Below Detection Limit? (Yes/No)	Are the Alt Fuel Emissions Within the Baseline Range? (Yes/No)	Does the Contaminant Emit in Negligible Amounts? (Yes/No) Ministry Emission Threshold Screening Procedure	Averaging Period POI Concentration	Percentage of Ministry POI Limit based on Maximum Sitewide Emissions Baseline (Oct 2018)	Percentage of Ministry POI Limit based on Maximum Sitewide Emissions Alt Fuel (Dec 2018)	Percentage of Ministry POI Limit based on Maximum Sitewide Emissions Post Baseline (Dec 2018)	Does the Contaminant Emit in Negligible Amounts? (Yes/No) Maximum Sitewide POI is <1% of Ministry POI Limit?	Is the Alt Fuel Percentage of POI Limit Within 1% of the range of the Baseline Percentage of POI Limits? (Yes/No)
Particulate														
PM	PM	24 hr	2.02E+00	4.17E+00	4.12E+00	No	No	No	24 hr	56.1%	56.1%	56.1%	No	Yes
PM10	PM10	24 hr	4.61E-01	5.08E-01	3.86E-01	No	No	No	-	90.7%	90.7%	90.7%	No	Yes
PM2.5	PM2.5	24 hr	1.84E-01	2.12E-01	1.75E-01	No	No	No	24 hr	91.1%	91.1%	91.1%	No	Yes
PM2.5	PM2.5	24 hr	1.84E-01	2.12E-01	1.75E-01	No	No	No	annual	48.2%	48.2%	48.2%	No	Yes
Combustion Gases														
NO_x	10102-44-0	1 hr	8.94E+01	8.67E+01	9.73E+01	No	No	No	1 hr	69.0%	65.3%	72.8%	No	No
NO_x	10102-44-0	24 hr	8.94E+01	8.67E+01	9.73E+01	No	No	No	24 hr	69.0%	65.3%	72.8%	No	No
SO_2	7446-09-5	1 hr	1.37E+02	1.69E+02	1.14E+02	No	No	No	1 hr	61.2%	73.7%	49.4%	No	No
SO_2	7446-09-5	24 hr	1.37E+02	1.69E+02	1.14E+02	No	No	No	24 hr	61.2%	73.7%	49.4%	No	No
CO	630-08-0	1 hr	1.19E+02	1.00E+02	7.49E+01	No	Yes	-	-	-	-	-	-	-
CO_2	124-38-9	n/a	5.96E+04	5.59E+04	5.51E+04	No	Yes	-	-	-	-	-	-	-
Ammonia														
Ammonia	7664-41-7	24 hr	5.95E+00	5.22E+00	4.06E+00	No	Yes	-	-	-	-	-	-	-
Hydrogen Chloride														
Hydrochloric Acid	7647-01-0	24 hr	1.45E+00	1.67E+00	6.03E-01	No	No	No	24 hr	7.2%	11.6%	4.2%	No	No
Metals and Metal Oxides														
Aluminum	7429-90-5	24 hr	6.07E-02	2.11E-02	1.47E-02	No	Yes	-	-	-	-	-	-	-
Aluminum Oxide	1344-28-1	24 hr	1.15E-01	3.99E-02	2.78E-02	No	Yes	-	-	-	-	-	-	-
Antimony	7440-36-0	24 hr	< 4.36E-04	< 5.07E-04	< 5.26E-04	Yes	-	-	-	-	-	-	-	-
Arsenic	7440-38-2	24 hr	< 1.39E-04	< 1.35E-04	< 1.40E-04	Yes	-	-	-	-	-	-	-	-
Barium	7440-39-3	24 hr	1.78E-03	1.91E-03	1.67E-03	No	No	No	24 hr	0.3%	0.3%	0.3%	Yes	-
Beryllium	7440-41-7	24 hr	< 2.62E-05	< 3.00E-05	< 3.16E-05	Yes	-	-	-	-	-	-	-	-
Boron	7440-42-8	24 hr	< 5.30E-03	< 5.07E-03	< 5.26E-03	Yes	-	-	-	-	-	-	-	-
Cadmium	7440-43-9	24 hr	3.15E-05	< 3.00E-05	< 3.20E-05	No	Yes	-	-	-	-	-	-	-
Calcium Oxide	1305-78-8	24 hr	9.69E-01	2.20E-01	1.16E-01	No	Yes	-	-	-	-	-	-	-
Chromium	7440-47-3	24 hr	< 5.30E-04	< 5.07E-04	< 5.30E-04	Yes	-	-	-	-	-	-	-	-
Cobalt	7440-48-4	24 hr	< 2.03E-04	< 3.20E-05	< 3.00E-05	Yes	-	-	-	-	-	-	-	-
Copper	7440-50-8	24 hr	3.27E-04	< 3.73E-04	< 2.67E-04	No	No	Yes	-	-	-	-	-	-
Iron	7439-89-6	24 hr	4.56E-02	2.36E-02	1.69E-02	No	Yes	-	-	-	-	-	-	-
Ferric Oxide	1309-37-1	24 hr	1.30E-01	6.75E-02	4.83E-02	No	Yes	-	-	-	-	-	-	-
Lead	7439-92-1	24 hr	1.19E-03	3.00E-04	1.80E-04	No	Yes	-	-	-	-	-	-	-
Magnesium	7439-95-4	24 hr	3.01E-02	1.80E-02	1.09E-02	No	Yes	-	-	-	-	-	-	-
Magnesium Oxide	1309-48-4	24 hr	4.99E-02	2.98E-02	1.81E-02	No	Yes	-	-	-	-	-	-	-
Manganese	7439-96-5	24 hr	1.71E-03	2.37E-03	5.50E-04	No	No	No	24 hr	27.8%	27.8%	27.8%	No	Yes
Mercury	7439-97-6	24 hr	4.03E-04	3.06E-04	< 1.73E-04	No	Yes	-	-	-	-	-	-	-
Molybdenum	7439-98-7	24 hr	8.93E-04	8.08E-04	1.03E-03	No	No	Yes	-	-	-	-	-	-
Nickel	7440-02-0	24 hr	5.18E-04	4.17E-04	3.21E-04	No	Yes	-	-	-	-	-	-	-
Nickel	7440-02-0	Annual	5.18E-04	4.17E-04	3.21E-04	No	Yes	-	-	-	-	-	-	-
Phosphorus	7723-14-0	24 hr	< 1.34E-02	< 1.55E-02	< 1.61E-02	Yes	-	-	-	-	-	-	-	-
Potassium	7440-09-7	24 hr	1.07E-01	< 2.66E-02	< 2.10E-02	No	Yes	-	-	-	-	-	-	-
Selenium	7782-49-2	24 hr	< 2.91E-04	< 3.38E-04	< 3.51E-04	Yes	-	-	-	-	-	-	-	-
Silver	7440-22-4	24 hr	< 3.60E-04	< 4.60E-05	< 5.00E-05	Yes	-	-	-	-	-	-	-	-
Strontium	7440-24-6	24 hr	1.39E-03	4.98E-04	2.20E-04	No	Yes	-	-	-	-	-	-	-
Thallium	7440-28-0	24 hr	< 4.12E-05	< 4.10E-05	< 4.20E-05	Yes	-	-	-	-	-	-	-	-
Tin	7440-31-5	24 hr	8.41E-03	3.34E-03	2.90E-03	No	Yes	-	-	-	-	-	-	-
Titanium	7440-32-6	24 hr	3.68E-03	1.85E-03	1.51E-03	No	Yes	-	-	-	-	-	-	-
Vanadium	7440-62-2	24 hr	< 1.02E-04	< 1.01E-04	< 1.05E-04	Yes	-	-	-	-	-	-	-	-
Zinc	7440-66-6	24 hr	< 2.64E-03	< 2.82E-03	< 1.75E-03	Yes	-	-	-	-	-	-	-	-
Volatile Organic Matter														
Acetone (2-Propanone)	67-64-1	24 hr	9.82E-02	1.23E-01	8.06E-02	No	No	Yes	-	-	-	-	-	-
Benzene	71-43-2	24 hr	2.44E-01	2.48E-01	2.77E-01	No	Yes	-	-	-	-	-	-	-
Benzene	71-43-2	Annual	2.44E-01	2.48E-01	2.77E-01	No	Yes	-	-	-	-	-	-	-
Bromodichloromethane	75-27-4	24 hr	< 1.66E-04	< 1.56E-04	< 1.57E-04	Yes	-	-	-	-	-	-	-	-
Bromoform	75-25-2	24 hr	< 2.11E-04	< 1.99E-04	< 2.00E-04	Yes	-	-	-	-	-	-	-	-
Bromomethane	74-83-9	24 hr	< 4.10E-03	1.11E-02	< 6.76E-03	No	No	Yes	-	-	-	-	-	-
Methyl Ethyl Ketone (2-Butanone)	78-93-3	24 hr	< 5.43E-04	< 5.11E-04	< 5.14E-04	Yes	-	-	-	-	-	-	-	-
Carbon Tetrachloride	56-23-5	24 hr	< 2.41E-04	< 2.27E-04	< 2.28E-04	Yes	-	-	-	-	-	-	-	-
Chlorobenzene	108-90-7	1 hr	5.60E-03	8.25E-03	< 5.21E-03	No	No	Yes	-	-	-	-	-	-
Chloroethane	75-00-3	24 hr	8.22E-03	8.90E-03	8.90E-03	No	Yes	-	-	-	-	-	-	-
Chloroform	67-66-3	24 hr	< 1.66E-04	< 1.56E-04	< 1.57E-04	Yes	-	-	-	-	-	-	-	-
Chloromethane	74-87-3	24 hr	7.31E-02	9.12E-02	1.02E-01	No	Yes	-	-	-	-	-	-	-
Cumene	98-82-8	24 hr	< 6.41E-02	< 1.11E-02	< 1.43E-02	Yes	-	-	-	-	-	-	-	-
Dibromochloromethane	124-48-1	24 hr	< 1.36E-04	< 1.28E-04	< 1.28E-04	Yes	-	-	-	-	-	-	-	-
1,1-Dichloroethane	75-34-3	24 hr	< 1.81E-04	< 1.70E-04	< 1.71E-04	Yes	-	-	-	-	-	-	-	-
1,2-Dichloroethane	107-06-2	24 hr	< 1.06E-04	< 9.90E-05	< 1.00E-04	Yes	-	-	-	-	-	-	-	-
1,1-Dichloroethylene	75-35-4	24 hr	< 1.66E-04	< 1.56E-04	< 1.57E-04	Yes	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethylene	156-59-2	24 hr	< 1.51E-04	< 1.42E-04	< 1.43E-04	Yes	-	-	-	-	-	-	-	-
trans-1,2-Dichloroethylene	156-60-5	24 hr	< 1.51E-04	< 1.42E-04	< 1.43E-04	Yes	-	-	-	-	-	-	-	-
1,2-Dichloropropane	78-87-5	24 hr	< 1.66E-04	< 1.56E-04	< 1.57E-04	Yes	-	-	-	-	-	-	-	-
Ethylbenzene	100-41-4	1 hr	3.23E-02	3.73E-02	3.98E-02	No	Yes	-	-	-	-	-	-	-
Ethylene Dibromide	106-93-4	24 hr	< 1.51E-04	< 1.42E-04	< 1.43E-04	Yes	-	-	-	-	-	-	-	-
Methylene Chloride(Dichloromethane)	75-09-2	24 hr	< 2.87E-04	< 2.70E-04	< 2.71E-04	Yes	-	-	-	-	-	-	-	-
Styrene	100-42-5	24 hr	3.42E-02	2.93E-02	3.97E-02	No	No	Yes	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	630-20-6	24 hr	< 1.51E-04	< 1.42E-04	< 1.43E-04	Yes	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	79-34-5	24 hr	< 2.11E-04	< 1.99E-04	< 2.00E-04	Yes	-	-	-	-	-	-	-	-
Tetrachloroethylene	127-18-4	24 hr	< 2.72E-04	< 2.56E-04	< 2.57E-04	Yes	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	71-55-6	24 hr	< 2.11E-04	< 1.99E-04	< 2.00E-04	Yes	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	79-00-5	24 hr	< 2.41E-04	< 2.27E-04	< 2.28E-04	Yes	-	-	-	-	-	-	-	-
Trichloroethylene	79-01-6	24 hr	< 1.66E-04	< 1.56E-04	< 1.57E-04	Yes	-	-	-	-	-	-	-	-
Toluene	108-88-3	24 hr	1.40E-01	1.61E-01	2.08E-01	No	Yes	-	-	-	-	-	-	-
Vinyl Chloride	75-01-4	24 hr	< 1.96E-04	< 7.03E-04	< 1.85E-04	Yes	-	-	-	-	-	-	-	-
Xylene	1330-20-7	1 hr	1.71E-01	2.17E-01	2.58E-01	No	Yes	-	-	-	-	-	-	-
Dioxins, Furans and Dioxin-like PCBs														
Dioxins, Furans and Dioxin-like PCBs	CDD	24 hr	2.74E-09	1.89E-09	1.93E-09	No	No	Yes	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons (PAHs)														
Benzo(a)pyrene	50-32-8	24 hr	< 2.18E-05	< 2.17E-05	< 2.17E-05	Yes	-	-	-	-	-	-	-	-
Benzo(a)pyrene	50-32-8	Annual	< 2.18E-05	< 2.17E-05	< 2.17E-05	Yes	-	-	-	-	-	-	-	-
2-Chloronaphthalene	91-58-7	24 hr	3.94E-04	2.99E-04	3.65E-04	No	No	Yes	-	-	-	-	-	-
1-Methylnaphthalene	90-12-0	24 hr	2.27E-02	2.19E-02	2.14E-02	No	Yes	-	-	-	-	-	-	-
Naphthalene	91-20-3	24 hr	< 5.42E-02	4.94E-02	4.75E-02	No	Yes	-	-	-	-	-	-	-
Tetralin	119-64-2	24 hr	< 1.41E-02	1.34E-02	1.19E-02	No	Yes	-	-	-	-	-	-	-
Chloronated Organics														
1,2-Dichlorobenzene	95-50-1	1 hr	< 4.99E-04	3.59E-04	5.00E-04	No	No	Yes	-	-	-	-	-	-
1,3-Dichlorobenzene	541-73-1	24 hr	1.54E-04	1.70E-04	2.54E-04	No	Yes	-	-	-	-	-	-	-
1,4-Dichlorobenzene	106-46-7	24 hr	1.19E-04	1.99E-04	2.69E-04	No	Yes	-	-	-	-	-	-	-
1,2,3-Trichlorobenzene	87-61-6	24 hr	1.31E-04	1.00E-04	1.94E-04	No	No	Yes	-	-	-	-	-	-
1,2,4-Trichlorobenzene	120-82-1	24 hr	< 1.14E-04	1.14E-04	1.82E-04	No	No	Yes	-	-	-	-	-	-
1,3,5-Trichlorobenzene	108-70-3	24 hr	< 2.39E-05	< 2.17E-05	< 2.17E-05	Yes	-	-	-	-	-	-	-	-
1,2,3,4-Tetrachlorobenzene	634-66-2	24 hr	< 2.18E-05	< 2.17E-05	< 2.17E-05	Yes	-	-	-	-	-	-	-	-
1,2,3,5+1,2,4,5-Tetrachlorobenzene	634-90-2 / 95-94-3	24 hr	< 2.18E-05	< 2.17E-05	< 2.17E-05	Yes	-	-	-	-	-	-	-	-
Pentachlorobenzene	608-93-5	24 hr	< 2.18E-05	< 2.17E-05	2.20E-05	No	Yes	-	-	-	-	-	-	-
Hexachlorobenzene	118-74-1	24 hr	2.18E-05	< 2.17E-05	< 2.17E-05	No	Yes	-	-	-	-	-	-	-
2-Chlorophenol	95-57-8	24 hr	< 5.21E-04	1.43E-03	1.33E-03	No	No	Yes	-	-	-	-	-	-
3-Chlorophenol (m-Chlorophenol)	108-43-0	24 hr	8.16E-05	1.65E-04	2.13E-04	No	Yes	-	-	-	-	-	-	-
4-Chlorophenol (p-Chlorophenol)	106-48-9	24 hr	< 1.17E-04	1.31E-04	1.75E-04	No	Yes	-	-	-	-	-	-	-
2,3-Dichlorophenol	576-24-9	24 hr	< 2.18E-05	< 2.17E-05	< 6.52E-05	Yes	-	-	-	-	-	-	-	-
2,4 + 2,5-Dichlorophenol	120-83-2 / 583-78-8	24 hr	< 2.18E-05	3.49E-05	< 7.48E-05	No	Yes	-	-	-	-	-	-	-
2,6-Dichlorophenol	87-65-0	24 hr	< 2.18E-05	< 2.17E-05	< 6.52E-05	Yes	-	-	-	-	-	-	-	-
3,4-Dichlorophenol	95-77-2	24 hr	< 2.18E-05	< 2.17E-05	< 6.52E-05	Yes	-	-	-	-	-	-	-	-
3,5-Dichlorophenol	591-35-5	24 hr	< 2.18E-05	< 2.45E-05	< 6.52E-05	Yes	-	-	-	-	-	-	-	-
2,3,4-Trichlorophenol	15950-66-0	24 hr	< 2.18E-05	< 2.17E-05	< 6.52E-05	Yes	-	-	-	-	-	-	-	-
2,3,5-Trichlorophenol	933-78-8	24 hr	< 2.18E-05	< 2.17E-05	< 6.50E-05	Yes	-	-	-	-	-	-	-	-
2,3,6-Trichlorophenol	933-75-5	24 hr	< 2.18E-05	< 2.17E-05	< 6.52E-05	Yes	-	-	-	-	-	-	-	-
2,4,5-Trichlorophenol	95-95-4	24 hr	< 2.18E-05	< 2.17E-05	< 6.52E-05	Yes	-	-	-	-	-	-	-	-
2,4,6-Trichlorophenol	88-06-2	24 hr	< 2.18E-05	< 2.17E-05	< 6.52E-05	Yes	-	-	-	-	-	-	-	-
3,4,5-Trichlorophenol	609-19-8	24 hr	< 2.18E-05	< 2.17E-05	< 6.52E-05	Yes	-	-	-	-	-	-	-	-
2,3,4,5-Tetrachlorophenol	4901-51-3	24 hr	2.18E-05	< 2.17E-05	< 6.50E-05	No	Yes	-	-	-	-	-	-	-
2,3,4,6-Tetrachlorophenol	58-90-2	24 hr	2.18E-05	< 2.17E-05	< 6.50E-05	No	Yes	-	-	-	-	-	-	-
2,3,5,6-Tetrachlorophenol	935-95-5	24 hr	< 2.18E-05	< 2.17E-05	< 6.50E-05	Yes	-	-	-	-	-	-	-	-
Pentachlorophenol	87-86-5	24 hr	< 2.18E-05	< 2.17E-05	< 6.52E-05	Yes	-	-	-	-	-	-	-	-

Appendix G

RWDI Ambient Air Monitoring Report

BCX

REPORT

ST MARYS CEMENT INC.

BOWMANVILLE, ONTARIO

AMBIENT AIR QUALITY MONITORING REPORT
RWDI # 1804600
April 5, 2019

SUBMITTED TO

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EXECUTIVE SUMMARY

RWDI AIR Inc. (RWDI) has been retained by St. Marys Cement Inc. (Canada), (St Marys) to conduct ambient monitoring in addition to the stack testing on the kiln exhaust at their facility in Bowmanville, Ontario. The purpose of this program is to demonstrate compliance with their demonstration Environmental Compliance Approval No.4614-826K9W dated November 5, 2014.

The Pre-Test Plan for this ambient testing program was submitted August 30, 2018 to the Ontario Ministry of the Environment, Conservation and Parks (MECP). Approval for the testing program was granted by the MECP on September 18, 2018. A copy of the MECP pre-test plan and approval letter can be found in **Appendix A**.

Testing was conducted over two separate dates on September 30 to October 12, 2018, and December 4 to 8, 2018. Pre-baseline testing was completed September 30 to October 2, post-baseline testing was completed December 7 and 8^{th}, and the alternative fuels testing was completed October 10 and 12, and December 4 to 6^{th}. Testing in the October timeframe did not meet the desired Alt Fuels firing rate, therefore, a repeat of the program was conducted in December.

The following report and corresponding testing results fulfills the requirements outlined in Schedule "C" of the ECA, Part B, "Reporting Procedures" subpart 2 "Ambient Air Monitoring Program". A summary of all testing results can be found in the **Tables** section of the report with detailed sampling results in the **Appendices**.

1 INTRODUCTION

RWDI AIR Inc. (RWDI) was retained by St Marys Cement Inc. (SMC) to conduct ambient monitoring in addition to the stack testing demonstration for alternative fuels required by ECA #4614-826K9W.

Section 7 of ECA #4614-826K9W requires an ambient monitoring counterpart to the stack testing. An Ambient Air Monitoring and Reporting Plan was prepared and approved by the Ministry of Environment, Conservation and Parks (MECP) to satisfy these conditions. The Plan and MECP approval of the plan is presented in Appendix A. Three (3) monitoring stations were established to monitor ambient air quality around St Marys Cement as described in section 1.2 and as shown in **Figure 1**.

1.1 Sampling Dates

Table 1 presents the sampling dates and frequency, the corresponding operating conditions and the sample duration.

Table 1: Sample Log

Sample Date/Frequency	Condition	Duration
September 30, 2018	Baseline	24 hr
October 1, 2018	Baseline	24 hr
October 2, 2018	Baseline	24 hr
October 3, 2018	Alt Fuels	24 hr
October 4, 2018	Baseline	24 hr
October 10, 2018	Alt Fuels	24 hr
October 11, 2018	Alt Fuels	24 hr
October 12, 2018	Alt Fuels	24 hr
December 4, 2018	Alt Fuels	24 hr
December 5, 2018	Alt Fuels	24 hr
December 6, 2018	Alt Fuels	24 hr
December 7, 2018	Baseline	24 hr
December 8, 2018	Baseline	24 hr

All of the stations were operational during the baseline and alternative fuels stack testing demonstrations. Due to production and mechanical issues, there were two windows of time in which samples were collected, one in October and one in December.

1.2 Sampling Locations

The demonstration required three (3) monitoring stations which collect discrete ambient measurements, known as OPG Station, Cove Station and Beach Station.

The OPG Station is located on OPG property just northwest of SMC. The Beach Station is located just southeast of the plant's southern gate. The Cove Station is located northeast of SMC. Cove and Beach ambient monitoring stations are on SMC private property located close to SMC ambient monitoring stations.

The locations of the ambient monitoring stations were determined through a combination of air dispersion modelling and consultation with SMC based on the locations of existing ambient/meteorological stations, access and power.

All three (3) ambient monitoring stations incorporated the same orientation of equipment. A picture of the Beach Station can be found in **Figure 2.**

Figure 2: RWDI Beach Monitoring Station

2 SAMPLING METHODOLOGY

Each RWDI ambient monitoring station was equipped with: High Volume (Hi-Vol) Air Sampler outfitted with a TSP inlet head as approved by the United States Environmental Protection Agency (U.S. EPA); a Hi-Vol Air Sampler outfitted with a polyurethane foam plug and circular quartz filter for measuring PAH's and D&F's as approved by U.S. EPA; a specially prepared canister as specified in EPA Compendium Method TO-14/15 with 24-hour mass flow controller supplied by Maxxam Labs for measuring VOC's; and an on-site calibrated pump with flow controller for use in combination with NIOSH 6009 tubes for measuring Hg.

2.1 Ambient Sampling for Metals

The Tisch TE-5170 high volumetric air samplers (Hi-Vols) were outfitted with an inlet capable of collecting particulate of all aerodynamic diameters. Each Hi-Vol is equipped with a mass flow controller, which ensures a flow rate of 40 cubic feet per minute (CFM), and an elapsed timer and a wheel timer for starting and stopping each sample. The Hi-Vols have Teflon coated glass fibre filters that are outfitted at the top of the sampler, and air is drawn through the filter.

The Teflon coated glass fibre filter media was pre and post weighed by Maxxam Analytics in Mississauga, Ontario. The filters are then analyzed for metals. Sampling for the metals listed in schedule B1 of the ECA was completed following U.S. EPA Method IO2. The metals analyzed followed procedures listed in IO3 and IO5.

Mercury in gaseous form, was collected separately from above. Collection media was the same as listed in NIOSH Method 6009. Two tubes were connected in series and analyzed separately to ensure no breakthrough has occurred. The tubes were placed at a height of 1.2m with air collected at a rate of 1.0 litre per minute. The sample rate was controlled with a flow controller in the pump and sample volume measured with a calibrated dry gas meter. After completion of the sample the tubes were kept cool prior to analysis.

Sampling was conducted on a 24-hour sampling schedule, ensuring the media switch is not conducted while the stack testing is occurring.

2.2 Ambient Sampling for PAH’s and Dioxins and Furans

The Dioxins, Furans, and PAH samples were collected using Tisch TE-1000 samplers which are listed as reference devices for U.S. EPA Methods TO-9 and TO-13. The samplers use a collection filter that is ‘backed-up’ by a polyurethane foam (PUF) plug. The airborne compounds present in the particulate phase are collected on the Teflon coated glass fibre filter and any compounds present in the vapour phase are absorbed in the PUF plug. Each PUF sampler is equipped with a mass flow controller, which can sustain 8 cubic feet per minute (CFM) of flow over the sampling period, an elapsed timer and a wheel timer for starting and stopping each sample.

The filter and PUF media/glassware was proofed and analyzed by Maxxam Analytics in Mississauga, Ontario. The filters and PUF/XAD plugs were then analyzed for PAH’s and D&F’s.

Sampling was conducted on a 24-hour sampling schedule, ensuring the media switch is not conducted while the stack testing is occurring.

2.3 Ambient Sampling for VOC’s

Sampling for the VOC’s listed in Schedule B1 were collected in specially prepared canisters as specified in EPA Compendium Method TO-14/15. Flow controllers were used to maintain a constant flow rate over the sampling period of 24 hours. The flow controllers were equipped with stainless steel sintered filters and stainless steel pressure gauges to ensure that the canisters remained under slightly negative pressure at the completion of each testing period.

Sampling was conducted on a 24-hour sampling schedule, ensuring the media switch is not conducted while the stack testing is occurring.

3 METEOROLOGICAL TOWERS

Continuous meteorological data (wind speed and wind direction) was recorded from three (3) SMC MET stations – "OPG Gate", "Cove Road" and "Dock" as shown in Figure 1. Each meteorological tower is approximately 3.5 metres tall and is outfitted with a RM Young 05103 VK wind head that recorded wind direction and wind speed. Meteorological data was collected at 1-minute intervals and was averaged using Envista processing software over a 1-hour period. For purposes of this report, wind speed and wind direction data for all three (3) monitoring stations was provided by the closest SMC MET station.

A summary of the meteorological data is provided in **Appendix B**.

4 SUMMARY OF AMBIENT MEASUREMENTS

A summary of the results by day and station can be found in the Tables section of the report. The meteorological data from the closet station is used to identify if the ambient stations were upwind, downwind or background, relative to the kiln stack.

Table 1: Sample Log
Table 2: Summary of Results –Metals
Table 3: Summary of Results – Dioxins and Furans
Table 4: Summary of Results – PAH's
Table 5: Summary of Results – VOC's
Table 6: Summary of Results – Hg

Detailed results are presented in in **Appendix C** for Metals Results; **Appendix D** for Dioxins and Furans and Polyaromatic Hydrocarbon Results; **Appendix E** for Volatile Organic Compounds Results; and **Appendix F** for Mercury.

Lab data, equipment calibrations, and field notes are provided in **Appendices, G, H** and **I** respectively.

5 OPERATING CONDITIONS

Operating conditions during the sampling period were monitored by SMC personnel. All equipment was operated under normal maximum operating conditions. Operating data is presented in Appendix D of the Alternative Fuel Demonstration Summary Report.

5.1 Sampling Instrumentation

The following sections outline any instrumentation issues encountered that caused data loss at any of the monitors at each of the stations.

5.1.1 OPG Station

Heavy rain on the night of 09/30/2018 caused a power outage to the whole station. The outage affected the Hi-Vol measuring Metals; the PUF sampler measuring D&F and PAH's; and the sampling pumps measuring Hg. The SUMA canisters measuring VOC's were not affected because they are non-powered samplers. Therefore, data collected on 09/30/2018 (baseline) from powered samplers is deemed invalid. This is a standard QA method based on minimum sample volume and duration collected.

5.1.2 Cove Station

Heavy rain on the night of 09/30/2018 caused a power outage to the Hi-Vol measuring Metals. The Hi-Vol was on separate circuit from all the other samplers that were unaffected. Therefore, data collected on 09/30/2018 (baseline) from the Hi-Vol (TSP and Metals) is deemed invalid. This is a standard QA method based on minimum sample volume and duration collected.

5.1.3 Beach Station

Heavy rain on the night of 10/01/2018 caused a power outage to the whole station. The outage affected the Hi-Vol measuring Metals; the PUF sampler measuring D&F and PAH's; and the sampling pumps measuring Hg. The SUMA canisters measuring VOC's were not affected because they are passive samplers. Therefore, data collected on 10/01/2018 (baseline) from powered samplers is deemed invalid. This is a standard QA method based on minimum sample volume and duration collected.

A SUMA canister along with sampling equipment was stolen on the night of December 5th, 2018 at the Beach Station. This sample was not recovered and therefore VOC data is not available for December 5th, 2018 sampling day. Preventative measures were soon after taken to prevent further tampering with equipment.

TABLES

Table 1: Sample Log

Sample Date/Frequency	Condition	Duration
September 30, 2018	Baseline	24 hr
October 1, 2018	Baseline	24 hr
October 2, 2018	Baseline	24 hr
October 3, 2018	Alt Fuels	24 hr
October 4, 2018	Baseline	24 hr
October 10, 2018	Alt Fuels	24 hr
October 11, 2018	Alt Fuels	24 hr
October 12, 2018	Alt Fuels	24 hr
December 4, 2018	Alt Fuels	24 hr
December 5, 2018	Alt Fuels	24 hr
December 6, 2018	Alt Fuels	24 hr
December 7, 2018	Baseline	24 hr
December 8, 2018	Baseline	24 hr

Table 2: Summary of Results - Metals

		Baseline											
		30-Sep-18			1-Oct-18			2-Oct-18			4-Oct-18		
		OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
Contaminant	Units	Background	Background	Background	Background	Background	Background	Background	Background	Background	Upwind	Background	Background
Aluminum (Al)	µg/m^3	Invalid	Invalid	0.076	0.060	0.057	Invalid	0.030	0.029	0.051	0.066	0.052	0.147
Antimony (Sb)	µg/m^3			0.006	0.007	0.006		0.006	0.006	0.006	0.006	0.006	0.007
Arsenic (As)	µg/m^3			0.004	0.004	0.004		0.004	0.004	0.004	0.004	0.004	0.004
Barium (Ba)	µg/m^3			0.007	0.010	0.004		0.007	0.004	0.003	0.008	0.004	0.004
Beryllium (Be)	µg/m^3			0.001	0.001	0.001		0.001	0.001	0.001	0.001	0.001	0.001
Boron (B)	µg/m^3			0.004	0.004	0.004		0.004	0.004	0.004	0.004	0.004	0.004
Cadmium (Cd)	µg/m^3			0.001	0.001	0.001		0.001	0.001	0.001	0.001	0.001	0.001
Calcium (Ca)	µg/m^3			1.759	0.974	0.767		0.421	0.442	1.743	0.914	1.124	5.079
Chromium (Cr)	µg/m^3			0.003	0.006	0.003		0.003	0.003	0.003	0.003	0.003	0.003
Cobalt (Co)	µg/m^3			0.001	0.001	0.001		0.001	0.001	0.001	0.001	0.001	0.001
Copper (Cu)	µg/m^3			0.109	0.030	0.069		0.073	0.101	0.112	0.054	0.055	0.040
Iron (Fe)	µg/m^3			0.208	0.165	0.178		0.120	0.113	0.118	0.178	0.128	0.279
Lead (Pb)	µg/m^3			0.003	0.002	0.002		0.002	0.002	0.002	0.002	0.002	0.002
Manganese (Mn)	µg/m^3			0.009	0.004	0.007		0.003	0.005	0.003	0.005	0.005	0.009
Molybdenum (Mo)	µg/m^3			0.005	0.002	0.002		0.004	0.003	0.005	0.003	0.002	0.002
Nickel (Ni)	µg/m^3			0.002	0.004	0.002		0.002	0.002	0.002	0.002	0.002	0.002
Phosphorus (P)	µg/m^3			0.019	0.040	0.017		0.019	0.021	0.019	0.035	0.027	0.033
Potassium (K)	µg/m^3			0.105	0.070	0.061		0.060	0.059	0.066	0.079	0.076	0.120
Selenium (Se)	µg/m^3			0.006	0.007	0.006		0.006	0.006	0.006	0.006	0.006	0.007
Silver (Ag)	µg/m^3			0.003	0.003	0.003		0.003	0.003	0.003	0.003	0.003	0.003
Strontium (Sr)	µg/m^3			0.004	0.002	0.001		0.001	0.001	0.003	0.002	0.002	0.010
Thallium (Tl)	µg/m^3			0.006	0.007	0.006		0.006	0.006	0.006	0.006	0.006	0.007
Tin (Sn)	µg/m^3			0.006	0.007	0.006		0.006	0.006	0.006	0.006	0.006	0.007
Titanium (Ti)	µg/m^3			0.006	0.007	0.006		0.006	0.006	0.006	0.006	0.006	0.007
Vanadium (V)	µg/m^3			0.003	0.003	0.003		0.003	0.003	0.003	0.003	0.003	0.003
Zinc (Zn)	µg/m^3			0.054	0.017	0.013		0.023	0.021	0.014	0.019	0.014	0.011

NOTE: All below detectable results

Table 2: Summary of Results

Contaminant	Units	Alt Fuel											
		3-Oct-18			10-Oct-18			11-Oct-18			12-Oct-18		
		OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
		Downwind	Background	Upwind	Background	Background	Background	Upwind	Downwind	Upwind	Upwind	Downwind	Downwind
Aluminum (Al)	µg/m³	0.130	0.046	0.043	0.572	0.096	0.094	0.143	0.180	0.442	0.134	0.151	0.394
Antimony (Sb)	µg/m³	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Arsenic (As)	µg/m³	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
Barium (Ba)	µg/m³	0.007	0.004	0.007	0.016	0.007	0.006	0.010	0.006	0.008	0.011	0.006	0.007
Beryllium (Be)	µg/m³	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Boron (B)	µg/m³	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
Cadmium (Cd)	µg/m³	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Calcium (Ca)	µg/m³	3.189	0.948	0.850	16.111	1.566	1.916	2.592	5.975	12.414	2.159	4.403	9.956
Chromium (Cr)	µg/m³	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Cobalt (Co)	µg/m³	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Copper (Cu)	µg/m³	0.065	0.099	0.073	0.043	0.107	0.050	0.029	0.035	0.015	0.048	0.053	0.016
Iron (Fe)	µg/m³	0.223	0.120	0.124	1.082	0.231	0.222	0.309	0.406	0.777	0.324	0.335	0.597
Lead (Pb)	µg/m³	0.002	0.002	0.002	0.003	0.004	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Manganese (Mn)	µg/m³	0.006	0.004	0.004	0.024	0.008	0.008	0.010	0.011	0.019	0.010	0.010	0.017
Molybdenum (Mo)	µg/m³	0.003	0.003	0.003	0.003	0.004	0.002	0.002	0.002	0.002	0.003	0.003	0.002
Nickel (Ni)	µg/m³	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Phosphorus (P)	µg/m³	0.033	0.019	0.022	0.090	0.038	0.038	0.096	0.063	0.075	0.048	0.025	0.038
Potassium (K)	µg/m³	0.108	0.061	0.061	0.398	0.105	0.103	0.172	0.179	0.397	0.139	0.113	0.311
Selenium (Se)	µg/m³	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Silver (Ag)	µg/m³	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Strontium (Sr)	µg/m³	0.006	0.002	0.002	0.034	0.003	0.004	0.004	0.011	0.024	0.004	0.008	0.019
Thallium (Tl)	µg/m³	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Tin (Sn)	µg/m³	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Titanium (Ti)	µg/m³	0.006	0.006	0.006	0.020	0.006	0.006	0.007	0.007	0.021	0.008	0.007	0.017
Vanadium (V)	µg/m³	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Zinc (Zn)	µg/m³	0.018	0.016	0.021	0.030	0.018	0.016	0.015	0.012	0.018	0.032	0.020	0.030

Table 2: Summary of Results

		Alt Fuel									Baseline					
		4-Dec-18			5-Dec-18			6-Dec-18			7-Dec-18			8-Dec-18		
		OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
Contaminant	Units	Uwind	Background	Downwind	Background	Background	Background	Upwind	Background	Downwind	Background	Upwind	Background	Background	Background	Background
Aluminum (Al)	µg/m^3	0.132	0.106	0.361	0.170	0.237	0.490	0.057	0.190	0.241	0.108	0.041	0.193	0.040	0.031	0.229
Antimony (Sb)	µg/m^3	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Arsenic (As)	µg/m^3	0.003	0.004	0.003	0.003	0.004	0.003	0.004	0.004	0.004	0.003	0.003	0.003	0.003	0.003	0.003
Barium (Ba)	µg/m^3	0.021	0.014	0.015	0.021	0.015	0.017	0.009	0.007	0.009	0.011	0.004	0.005	0.007	0.005	0.006
Beryllium (Be)	µg/m^3	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Boron (B)	µg/m^3	0.003	0.004	0.003	0.003	0.004	0.003	0.004	0.004	0.004	0.003	0.003	0.003	0.003	0.003	0.003
Cadmium (Cd)	µg/m^3	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Calcium (Ca)	µg/m^3	3.350	3.434	14.410	3.402	6.350	13.930	0.973	5.364	6.714	1.880	0.942	6.756	0.718	0.667	5.169
Chromium (Cr)	µg/m^3	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Cobalt (Co)	µg/m^3	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Copper (Cu)	µg/m^3	0.087	0.052	0.046	0.044	0.037	0.018	0.034	0.019	0.011	0.069	0.010	0.026	0.048	0.012	0.014
Iron (Fe)	µg/m^3	0.479	0.370	0.740	0.569	0.587	0.916	0.230	0.374	0.388	0.269	0.139	0.375	0.166	0.130	0.318
Lead (Pb)	µg/m^3	0.002	0.002	0.002	0.003	0.004	0.004	0.002	0.002	0.004	0.002	0.002	0.002	0.002	0.002	0.002
Manganese (Mn)	µg/m^3	0.011	0.009	0.019	0.017	0.017	0.023	0.006	0.009	0.010	0.007	0.004	0.009	0.004	0.003	0.008
Molybdenum (Mo)	µg/m^3	0.005	0.003	0.003	0.003	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.003	0.002	0.002
Nickel (Ni)	µg/m^3	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Phosphorus (P)	µg/m^3	0.022	0.015	0.029	0.023	0.020	0.033	0.015	0.016	0.017	0.014	0.014	0.016	0.014	0.014	0.014
Potassium (K)	µg/m^3	0.067	0.069	0.197	0.075	0.182	0.473	0.060	0.141	0.373	0.056	0.056	0.107	0.057	0.057	0.214
Selenium (Se)	µg/m^3	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Silver (Ag)	µg/m^3	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Strontium (Sr)	µg/m^3	0.007	0.006	0.026	0.007	0.012	0.026	0.002	0.010	0.013	0.004	0.002	0.013	0.003	0.002	0.010
Thallium (Tl)	µg/m^3	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Tin (Sn)	µg/m^3	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Titanium (Ti)	µg/m^3	0.013	0.007	0.010	0.013	0.012	0.019	0.006	0.008	0.009	0.007	0.006	0.006	0.006	0.006	0.012
Vanadium (V)	µg/m^3	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Zinc (Zn)	µg/m^3	0.031	0.016	0.018	0.057	0.047	0.040	0.017	0.015	0.016	0.021	0.009	0.009	0.017	0.011	0.013

Table 3: Summary of Results - Dioxins and Furans

		Baseline											
		30-Sep-18			1-Oct-18			2-Oct-18			4-Oct-18		
Contaminant	Units	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
		Background	Background	Background	Background	Background	Background	Background	Background	Background	Upwind	Background	Background
2,3,7,8-TCDD	pg/m^3	Invalid	0.0138	0.0125	0.0136	0.0129	Invalid	0.0114	0.0128	0.0119	0.0136	0.0105	0.0106
1,2,3,7,8-PeCDD	pg/m^3		0.0141	0.0131	0.0139	0.0110		0.0108	0.0110	0.0122	0.0110	0.0121	0.0140
1,2,3,4,7,8-HxCDD	pg/m^3		0.0151	0.0138	0.0136	0.0142		0.0130	0.0128	0.0131	0.0136	0.0144	0.0154
1,2,3,6,7,8-HxCDD	pg/m^3		0.0148	0.0135	0.0132	0.0139		0.0127	0.0125	0.0128	0.0133	0.0141	0.0151
1,2,3,7,8,9-HxCDD	pg/m^3		0.0145	0.0131	0.0132	0.0136		0.0127	0.0125	0.0128	0.0133	0.0141	0.0151
1,2,3,4,6,7,8-HpCDD	pg/m^3		0.0664	0.0846	0.0216	0.0132		0.0361	0.0421	0.0300	0.0123	0.0131	0.0130
OCDD	pg/m^3		0.1914	0.2394	0.0561	0.0375		0.1206	0.1625	0.0944	0.0385	0.0272	0.0377
2,3,7,8-TCDF	pg/m^3		0.0141	0.0141	0.0153	0.0123		0.0114	0.0128	0.0141	0.0143	0.0128	0.0130
1,2,3,7,8-PeCDF	pg/m^3		0.0122	0.0119	0.0146	0.0139		0.0123	0.0122	0.0109	0.0136	0.0134	0.0151
2,3,4,7,8-PeCDF	pg/m^3		0.0122	0.0122	0.0146	0.0142		0.0127	0.0125	0.0113	0.0140	0.0137	0.0151
1,2,3,4,7,8-HxCDF	pg/m^3		0.0105	0.0131	0.0129	0.0120		0.0114	0.0098	0.0106	0.0113	0.0109	0.0130
1,2,3,6,7,8-HxCDF	pg/m^3		0.0102	0.0125	0.0122	0.0117		0.0111	0.0095	0.0103	0.0110	0.0105	0.0127
2,3,4,6,7,8-HxCDF	pg/m^3		0.0118	0.0147	0.0143	0.0136		0.0130	0.0110	0.0119	0.0126	0.0125	0.0147
1,2,3,7,8,9-HxCDF	pg/m^3		0.0138	0.0167	0.0164	0.0155		0.0149	0.0125	0.0138	0.0143	0.0141	0.0168
1,2,3,4,6,7,8-HpCDF	pg/m^3		0.0115	0.0115	0.0115	0.0117		0.0092	0.0095	0.0106	0.0090	0.0080	0.0092
1,2,3,4,7,8,9-HpCDF	pg/m^3		0.0168	0.0167	0.0167	0.0167		0.0133	0.0134	0.0153	0.0130	0.0115	0.0130
OCDF	pg/m^3		0.0115	0.0131	0.0132	0.0205		0.0133	0.0125	0.0119	0.0146	0.0144	0.0154
Total Toxic Equivalency	$pg\ TEQ/m^3$		0.0434	0.0420	0.0439	0.0397		0.0370	0.0378	0.0384	0.0399	0.0380	0.0414

NOTE: All below detectable results

Table 3: Summary of Results - Dioxir

		Alt Fuel											
		3-Oct-18			10-Oct-18			11-Oct-18			12-Oct-18		
Contaminant	Units	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
		Downwind	Background	Upwind	Background	Background	Background	Upwind	Downwind	Upwind	Upwind	Downwind	Downwind
2,3,7,8-TCDD	pg/m^3	0.0111	0.0101	0.0133	0.0121	0.0108	0.0104	0.0081	0.0094	0.0092	0.0079	0.0098	0.0098
1,2,3,7,8-PeCDD	pg/m^3	0.0115	0.0123	0.0118	0.0111	0.0115	0.0098	0.0104	0.0094	0.0114	0.0085	0.0098	0.0098
1,2,3,4,7,8-HxCDD	pg/m^3	0.0137	0.0126	0.0139	0.0111	0.0105	0.0104	0.0107	0.0088	0.0098	0.0101	0.0107	0.0108
1,2,3,6,7,8-HxCDD	pg/m^3	0.0134	0.0123	0.0136	0.0114	0.0108	0.0104	0.0107	0.0088	0.0095	0.0098	0.0104	0.0108
1,2,3,7,8,9-HxCDD	pg/m^3	0.0134	0.0123	0.0133	0.0108	0.0102	0.0101	0.0104	0.0085	0.0095	0.0098	0.0104	0.0104
1,2,3,4,6,7,8-HpCDD	pg/m^3	0.0328	0.0278	0.0288	0.0170	0.0178	0.0182	0.0110	0.0119	0.0121	0.0489	0.0325	0.0601
OCDD	pg/m^3	0.1022	0.1013	0.0960	0.0654	0.0608	0.0717	0.0589	0.0495	0.0432	0.1401	0.0837	0.1487
2,3,7,8-TCDF	pg/m^3	0.0134	0.0132	0.0133	0.0098	0.0111	0.0101	0.0100	0.0091	0.0092	0.0085	0.0104	0.0095
1,2,3,7,8-PeCDF	pg/m^3	0.0140	0.0136	0.0127	0.0124	0.0105	0.0098	0.0100	0.0094	0.0098	0.0088	0.0104	0.0095
2,3,4,7,8-PeCDF	pg/m^3	0.0143	0.0139	0.0127	0.0127	0.0105	0.0101	0.0104	0.0094	0.0102	0.0088	0.0107	0.0098
1,2,3,4,7,8-HxCDF	pg/m^3	0.0102	0.0104	0.0108	0.0092	0.0096	0.0098	0.0091	0.0091	0.0073	0.0095	0.0086	0.0092
1,2,3,6,7,8-HxCDF	pg/m^3	0.0099	0.0101	0.0105	0.0092	0.0099	0.0094	0.0091	0.0088	0.0070	0.0095	0.0083	0.0089
2,3,4,6,7,8-HxCDF	pg/m^3	0.0115	0.0117	0.0121	0.0098	0.0105	0.0111	0.0104	0.0100	0.0083	0.0107	0.0098	0.0101
1,2,3,7,8,9-HxCDF	pg/m^3	0.0131	0.0132	0.0139	0.0111	0.0118	0.0127	0.0120	0.0116	0.0092	0.0123	0.0110	0.0117
1,2,3,4,6,7,8-HpCDF	pg/m^3	0.0092	0.0082	0.0093	0.0095	0.0099	0.0072	0.0061	0.0075	0.0086	0.0085	0.0083	0.0092
1,2,3,4,7,8,9-HpCDF	pg/m^3	0.0134	0.0117	0.0133	0.0127	0.0131	0.0104	0.0091	0.0110	0.0124	0.0120	0.0120	0.0133
OCDF	pg/m^3	0.0102	0.0136	0.0127	0.0225	0.0197	0.0107	0.0087	0.0097	0.0095	0.0101	0.0190	0.0199
Total Toxic Equivalency	pg TEQ/m^3	0.0379	0.0372	0.0399	0.0359	0.0347	0.0355	0.0304	0.0297	0.0313	0.0281	0.0316	0.0320

Table 3: Summary of Results - Dioxir

		Alt Fuel									Baseline					
		4-Dec-18			5-Dec-18			6-Dec-18			7-Dec-18			8-Dec-18		
Contaminant	Units	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
		Uwind	Background	Downwind	Background	Background	Background	Upwind	Background	Downwind	Background	Upwind	Background	Background	Background	Background
2,3,7,8-TCDD	pg/m^3	0.0110	0.0108	0.0110	0.0098	0.0096	0.0113	0.0214	0.0110	0.0125	0.0114	0.0099	0.0106	0.0096	0.0098	0.0113
1,2,3,7,8-PeCDD	pg/m^3	0.0106	0.0111	0.0110	0.0111	0.0099	0.0109	0.0119	0.0110	0.0115	0.0098	0.0105	0.0109	0.0102	0.0104	0.0116
1,2,3,4,7,8-HxCDD	pg/m^3	0.0130	0.0143	0.0130	0.0114	0.0125	0.0123	0.0116	0.0110	0.0118	0.0110	0.0099	0.0109	0.0105	0.0111	0.0113
1,2,3,6,7,8-HxCDD	pg/m^3	0.0233	0.0357	0.0250	0.0101	0.0109	0.0109	0.0133	0.0097	0.0122	0.0132	0.0155	0.0139	0.0109	0.0111	0.0116
1,2,3,7,8,9-HxCDD	pg/m^3	0.0249	0.0538	0.0281	0.0101	0.0109	0.0126	0.0102	0.0120	0.0133	0.0177	0.0204	0.0189	0.0099	0.0101	0.0106
1,2,3,4,6,7,8-HpCDD	pg/m^3	0.2701	0.4013	0.3086	0.0668	0.0655	0.0689	0.1551	0.0692	0.0821	0.1199	0.1276	0.1175	0.0473	0.0544	0.0584
OCDD	pg/m^3	0.5216	0.6847	0.5651	0.1671	0.1565	0.1706	0.3673	0.2003	0.2674	0.2366	0.2960	0.2798	0.1502	0.1718	0.1833
2,3,7,8-TCDF	pg/m^3	0.0183	0.0153	0.0134	0.0117	0.0131	0.0297	0.0119	0.0114	0.0118	0.0107	0.0099	0.0109	0.0131	0.0098	0.0212
1,2,3,7,8-PeCDF	pg/m^3	0.0100	0.0099	0.0110	0.0098	0.0099	0.0106	0.0116	0.0100	0.0118	0.0114	0.0099	0.0103	0.0109	0.0101	0.0106
2,3,4,7,8-PeCDF	pg/m^3	0.0100	0.0099	0.0110	0.0101	0.0099	0.0109	0.0119	0.0104	0.0118	0.0110	0.0099	0.0103	0.0109	0.0101	0.0106
1,2,3,4,7,8-HxCDF	pg/m^3	0.0100	0.0096	0.0103	0.0098	0.0105	0.0099	0.0105	0.0104	0.0122	0.0098	0.0093	0.0106	0.0099	0.0098	0.0106
1,2,3,6,7,8-HxCDF	pg/m^3	0.0090	0.0086	0.0092	0.0088	0.0096	0.0089	0.0095	0.0094	0.0122	0.0095	0.0093	0.0106	0.0099	0.0095	0.0106
2,3,4,6,7,8-HxCDF	pg/m^3	0.0106	0.0102	0.0110	0.0104	0.0115	0.0106	0.0116	0.0114	0.0129	0.0101	0.0099	0.0113	0.0105	0.0101	0.0113
1,2,3,7,8,9-HxCDF	pg/m^3	0.0120	0.0118	0.0123	0.0121	0.0128	0.0119	0.0129	0.0127	0.0140	0.0110	0.0108	0.0123	0.0115	0.0111	0.0123
1,2,3,4,6,7,8-HpCDF	pg/m^3	0.0093	0.0172	0.0168	0.0124	0.0086	0.0143	0.0095	0.0087	0.0136	0.0101	0.0090	0.0096	0.0089	0.0089	0.0102
1,2,3,4,7,8,9-HpCDF	pg/m^3	0.0123	0.0118	0.0123	0.0124	0.0121	0.0137	0.0133	0.0120	0.0125	0.0110	0.0111	0.0119	0.0109	0.0108	0.0126
OCDF	pg/m^3	0.0153	0.0175	0.0195	0.0114	0.0112	0.0109	0.0156	0.0110	0.0161	0.0126	0.0139	0.0116	0.0112	0.0108	0.0119
Total Toxic Equivalency	pg TEQ/m^3	0.0402	0.0455	0.0414	0.0336	0.0329	0.0329	0.0483	0.0351	0.0391	0.0356	0.0347	0.0347	0.0326	0.0326	0.0372

Table 4: Summary of Results Comparison - PAHs

		Baseline											
		30-Sep-18			1-Oct-18			2-Oct-18			4-Oct-18		
Contaminant	Units	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
		Background	Background	Background	Background	Background	Background	Background	Background	Background	Upwind	Background	Background
1-Methylnaphthalene	ng/m^3	Invalid	2.27	2.69	1.67	1.14	Invalid	2.09	2.38	2.16	1.20	1.05	0.92
1-Methylphenanthrene	ng/m^3		0.49	0.48	0.52	0.47		0.47	1.01	0.47	0.50	0.48	0.82
2-Chloronaphthalene	ng/m^3		0.49	0.48	0.52	0.47		0.47	0.46	0.47	0.50	0.48	0.51
2-Methylanthracene	ng/m^3		0.49	0.48	0.52	0.47		0.47	0.46	0.47	0.50	0.48	0.51
2-Methylnaphthalene	ng/m^3		3.45	4.04	2.72	1.14		3.42	3.75	3.56	1.89	1.63	1.54
3-Methylcholanthrene	ng/m^3		9.87	9.62	10.45	9.46		9.49	9.15	9.38	9.97	9.58	10.27
7,12-Dimethylbenzo(a)anthracene	ng/m^3		1.97	1.92	2.09	1.89		1.90	1.83	1.88	1.99	1.92	2.05
9,10-Dimethylanthracene	ng/m^3		1.97	1.92	2.09	1.89		1.90	1.83	1.88	1.99	1.92	2.05
Acenaphthene	ng/m^3		1.09	0.96	0.42	1.14		0.57	0.82	0.56	0.30	0.58	0.51
Acenaphthylene	ng/m^3		0.25	0.24	0.26	0.24		0.24	0.23	0.23	0.25	0.24	0.26
Anthracene	ng/m^3		0.25	0.24	0.26	0.24		0.24	0.46	0.23	0.25	0.24	0.31
Benzo(a)Anthracene	ng/m^3		0.25	0.24	0.26	0.24		0.24	0.23	0.23	0.25	0.24	0.26
Benzo(a)fluorene	ng/m^3		0.49	0.48	0.52	0.47		0.47	0.46	0.47	0.50	0.48	0.51
Benzo(b)Fluoranthene	ng/m^3		0.25	0.24	0.26	0.24		0.24	0.23	0.23	0.25	0.24	0.26
Benzo(b)fluorene	ng/m^3		0.49	0.48	0.52	0.47		0.47	0.46	0.47	0.50	0.48	0.51
Benzo(e)Pyrene	ng/m^3		0.49	0.48	0.52	0.47		0.47	0.46	0.47	0.50	0.48	0.51
Benzo(g,h,i)Perylene	ng/m^3		0.25	0.24	0.26	0.24		0.24	0.23	0.23	0.25	0.24	0.26
Benzo(k)Fluoranthene	ng/m^3		0.25	0.24	0.26	0.24		0.24	0.23	0.23	0.25	0.24	0.26
Chrysene	ng/m^3		0.25	0.24	0.26	0.24		0.24	0.37	0.23	0.25	0.24	0.26
Coronene	ng/m^3		0.49	0.48	0.52	0.47		0.47	0.46	0.47	0.50	0.48	0.51
Dibenzo(a,h)Anthracene	ng/m^3		0.25	0.24	0.26	0.24		0.24	0.23	0.23	0.25	0.24	0.26
Dibenzo(a,c) anthracene + Picene	ng/m^3		0.49	0.48	0.52	0.47		0.47	0.46	0.47	0.50	0.48	0.51
Dibenzo(a,c)anthracene	ng/m^3		0.49	0.48	0.52	0.47		0.47	0.46	0.47	0.50	0.48	0.51
Dibenzo(a,e)pyrene	ng/m^3		0.99	0.96	1.05	0.95		0.95	0.91	0.94	1.00	0.96	1.03
Fluoranthene	ng/m^3		0.39	0.77	0.42	1.14		0.28	1.46	0.47	0.25	0.29	1.03
Fluorene	ng/m^3		1.18	1.25	0.52	1.14		0.76	1.46	0.75	0.50	0.67	0.92
Indeno(1,2,3-cd)Pyrene	ng/m^3		0.25	0.24	0.26	0.24		0.24	0.23	0.23	0.25	0.24	0.26
Naphthalene	ng/m^3		14.11	15.96	7.74	1.14		10.35	10.70	8.44	5.28	4.41	3.80
Perylene	ng/m^3		0.49	0.48	0.52	0.47		0.47	0.46	0.47	0.50	0.48	0.51
Phenanthrene	ng/m^3		2.07	3.08	1.46	1.14		1.42	5.95	1.69	1.00	1.53	4.11
Picene	ng/m^3		0.49	0.48	0.52	0.47		0.47	0.46	0.47	0.50	0.48	0.51
Pyrene	ng/m^3		0.30	0.48	0.31	1.14		0.24	1.10	0.28	0.25	0.29	0.82
Tetralin	ng/m^3		0.99	1.35	0.84	1.14		1.14	1.65	1.78	0.70	0.58	0.62
Benzo(a)Pyrene	ng/m^3		0.04	0.05	0.02	0.03		0.02	0.02	0.05	0.01	0.02	0.07
Total PAH[4]	ng/m^3		48.35	52.50	39.90	31.78		41.89	51.01	41.07	34.05	32.85	38.08

NOTE: All below detectable results

Table 4: Summary of Results Comparisor

Contaminant	Units	Alt Fuel											
		3-Oct-18			10-Oct-18			11-Oct-18			12-Oct-18		
		OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
		Downwind	Background	Upwind	Background	Background	Background	Upwind	Downwind	Upwind	Upwind	Downwind	Downwind
1-Methylnaphthalene	ng/m^3	2.20	1.70	1.49	5.59	3.63	3.62	2.04	2.82	4.38	2.27	2.94	3.04
1-Methylphenanthrene	ng/m^3	0.48	0.47	0.74	0.49	0.67	0.68	0.49	0.47	0.48	0.47	0.46	0.47
2-Chloronaphthalene	ng/m^3	0.48	0.47	0.46	0.49	0.48	0.49	0.49	0.47	0.48	0.47	0.46	0.47
2-Methylanthracene	ng/m^3	0.48	0.47	0.46	0.49	0.48	0.49	0.49	0.47	0.48	0.47	0.46	0.47
2-Methylnaphthalene	ng/m^3	3.63	2.65	2.41	8.92	5.64	5.57	3.50	4.70	6.76	3.88	4.88	4.84
3-Methylcholanthrene	ng/m^3	9.55	9.46	9.29	9.80	9.55	9.77	9.71	9.40	9.52	9.46	9.20	9.49
7,12-Dimethylbenzo(a)anthracene	ng/m^3	1.91	1.89	1.86	1.96	1.91	1.95	1.94	1.88	1.90	1.89	1.84	1.90
9,10-Dimethylanthracene	ng/m^3	1.91	1.89	1.86	1.96	1.91	1.95	1.94	1.88	1.90	1.89	1.84	1.90
Acenaphthene	ng/m^3	0.57	0.47	0.56	2.06	1.43	1.17	1.07	0.85	0.95	0.76	0.83	0.85
Acenaphthylene	ng/m^3	0.24	0.24	0.23	0.25	0.24	0.24	0.24	0.24	0.24	0.24	0.23	0.24
Anthracene	ng/m^3	0.24	0.47	0.28	0.25	0.24	0.24	0.24	0.24	0.24	0.24	0.23	0.24
Benzo(a)Anthracene	ng/m^3	0.24	0.24	0.23	0.25	0.24	0.24	0.24	0.24	0.24	0.24	0.23	0.24
Benzo(a)fluorene	ng/m^3	0.48	0.47	0.46	0.49	0.48	0.49	0.49	0.47	0.48	0.47	0.46	0.47
Benzo(b)Fluoranthene	ng/m^3	0.24	0.24	0.23	0.25	0.24	0.24	0.24	0.24	0.24	0.24	0.23	0.24
Benzo(b)fluorene	ng/m^3	0.48	0.47	0.46	0.49	0.48	0.49	0.49	0.47	0.48	0.47	0.46	0.47
Benzo(e)Pyrene	ng/m^3	0.48	0.47	0.46	0.49	0.48	0.49	0.49	0.47	0.48	0.47	0.46	0.47
Benzo(g,h,i)Perylene	ng/m^3	0.24	0.24	0.23	0.25	0.24	0.24	0.24	0.24	0.24	0.24	0.23	0.24
Benzo(k)Fluoranthene	ng/m^3	0.24	0.24	0.23	0.25	0.24	0.24	0.24	0.24	0.24	0.24	0.23	0.24
Chrysene	ng/m^3	0.24	0.24	0.23	0.25	0.29	0.29	0.24	0.28	0.24	0.24	0.23	0.24
Coronene	ng/m^3	0.48	0.47	0.46	0.49	0.48	0.49	0.49	0.47	0.48	0.47	0.46	0.47
Dibenzo(a,h)Anthracene	ng/m^3	0.24	0.24	0.23	0.25	0.24	0.24	0.24	0.24	0.24	0.24	0.23	0.24
Dibenzo(a,c) anthracene + Picene	ng/m^3	0.48	0.47	0.46	0.49	0.48	0.49	0.49	0.47	0.48	0.47	0.46	0.47
Dibenzo(a,c)anthracene	ng/m^3	0.48	0.47	0.46	0.49	0.48	0.49	0.49	0.47	0.48	0.47	0.46	0.47
Dibenzo(a,e)pyrene	ng/m^3	0.96	0.95	0.93	0.98	0.96	0.98	0.97	0.94	0.95	0.95	0.92	0.95
Fluoranthene	ng/m^3	0.48	0.85	1.30	1.37	1.43	1.66	0.39	0.85	0.57	0.38	0.28	0.28
Fluorene	ng/m^3	0.76	1.51	1.21	2.25	2.58	1.95	1.17	1.22	1.14	0.66	0.74	0.76
Indeno(1,2,3-cd)Pyrene	ng/m^3	0.24	0.24	0.23	0.25	0.24	0.24	0.24	0.24	0.24	0.24	0.23	0.24
Naphthalene	ng/m^3	8.60	7.48	6.78	21.37	15.29	15.24	10.87	11.66	13.05	10.79	10.21	10.25
Perylene	ng/m^3	0.48	0.47	0.46	0.49	0.48	0.49	0.49	0.47	0.48	0.47	0.46	0.47
Phenanthrene	ng/m^3	1.72	3.88	4.64	5.10	6.02	6.06	2.14	3.39	2.76	1.42	1.20	1.42
Picene	ng/m^3	0.48	0.47	0.46	0.49	0.48	0.49	0.49	0.47	0.48	0.47	0.46	0.47
Pyrene	ng/m^3	0.29	0.85	0.93	0.69	1.43	1.17	0.24	0.56	0.38	0.24	0.23	0.24
Tetralin	ng/m^3	1.82	0.85	0.84	3.73	1.72	1.86	0.97	1.88	2.38	1.14	2.21	1.80
Benzo(a)Pyrene	ng/m^3	0.02	0.02	0.02	0.02	0.03	0.02	0.01	0.02	0.00	0.02	0.01	0.02
Total PAH[4]	ng/m^3	41.82	42.04	41.63	73.41	61.17	60.80	44.48	49.39	54.05	43.08	44.46	45.11

Table 4: Summary of Results Comparisor

Contaminant	Units	Alt Fuel									Baseline					
		4-Dec-18			5-Dec-18			6-Dec-18			7-Dec-18			8-Dec-18		
		OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
		Uwind	Background	Downwind	Background	Background	Background	Upwind	Background	Downwind	Background	Upwind	Background	Background	Background	Background
1-Methylnaphthalene	ng/m^3	4.98	6.50	7.09	5.67	6.90	7.99	3.16	3.21	3.01	2.65	2.32	2.19	3.16	3.61	3.69
1-Methylphenanthrene	ng/m^3	0.50	0.57	0.51	0.49	0.48	0.51	0.51	0.50	0.54	0.47	0.46	0.50	0.48	0.47	0.51
2-Chloronaphthalene	ng/m^3	0.50	0.48	0.51	0.49	0.48	0.51	0.51	0.50	0.54	0.47	0.46	0.50	0.48	0.47	0.51
2-Methylanthracene	ng/m^3	0.50	0.48	0.51	0.49	0.48	0.51	0.51	0.50	0.54	0.47	0.46	0.50	0.48	0.47	0.51
2-Methylnaphthalene	ng/m^3	7.97	10.32	11.10	9.48	11.31	13.00	5.20	5.12	4.73	4.26	3.53	3.18	5.37	5.79	5.84
3-Methylcholanthrene	ng/m^3	9.97	9.55	10.27	9.77	9.58	10.24	10.20	10.03	10.75	9.46	9.29	9.93	9.58	9.49	10.24
7,12-Dimethylbenzo(a)anthracene	ng/m^3	1.99	1.91	2.05	1.95	1.92	2.05	2.04	2.01	2.15	1.89	1.86	1.99	1.92	1.90	2.05
9,10-Dimethylanthracene	ng/m^3	1.99	1.91	2.05	1.95	1.92	2.05	2.04	2.01	2.15	1.89	1.86	1.99	1.92	1.90	2.05
Acenaphthene	ng/m^3	0.60	0.86	0.62	0.68	0.58	0.72	0.51	0.40	0.43	0.28	0.37	0.30	0.38	0.47	0.41
Acenaphthylene	ng/m^3	1.50	2.01	1.34	0.24	0.24	0.26	0.26	0.25	0.27	0.28	0.23	0.25	0.24	0.24	0.26
Anthracene	ng/m^3	0.25	0.24	0.26	0.24	0.24	0.26	0.26	0.25	0.27	0.24	0.23	0.25	0.24	0.24	0.26
Benzo(a)Anthracene	ng/m^3	0.30	0.48	0.31	0.24	0.24	0.26	0.26	0.25	0.27	0.24	0.23	0.25	0.24	0.24	0.26
Benzo(a)fluorene	ng/m^3	0.50	0.48	0.51	0.49	0.48	0.51	0.51	0.50	0.54	0.47	0.46	0.50	0.48	0.47	0.51
Benzo(b)Fluoranthene	ng/m^3	0.50	0.67	0.41	0.24	0.29	0.26	0.26	0.25	0.27	0.24	0.23	0.25	0.24	0.24	0.26
Benzo(b)fluorene	ng/m^3	0.50	0.48	0.51	0.49	0.48	0.51	0.51	0.50	0.54	0.47	0.46	0.50	0.48	0.47	0.51
Benzo(e)Pyrene	ng/m^3	0.50	0.48	0.51	0.49	0.48	0.51	0.51	0.50	0.54	0.47	0.46	0.50	0.48	0.47	0.51
Benzo(g,h,i)Perylene	ng/m^3	0.30	0.38	0.31	0.24	0.24	0.26	0.26	0.25	0.27	0.24	0.23	0.25	0.24	0.24	0.26
Benzo(k)Fluoranthene	ng/m^3	0.25	0.24	0.26	0.24	0.24	0.26	0.26	0.25	0.27	0.24	0.23	0.25	0.24	0.24	0.26
Chrysene	ng/m^3	0.40	0.57	0.41	0.24	0.29	0.31	0.26	0.25	0.27	0.24	0.23	0.25	0.24	0.24	0.26
Coronene	ng/m^3	0.50	0.48	0.51	0.49	0.48	0.51	0.51	0.50	0.54	0.47	0.46	0.50	0.48	0.47	0.51
Dibenzo(a,h)Anthracene	ng/m^3	0.25	0.24	0.26	0.24	0.24	0.26	0.26	0.25	0.27	0.24	0.23	0.25	0.24	0.24	0.26
Dibenzo(a,c) anthracene + Picene	ng/m^3	0.50	0.48	0.51	0.49	0.48	0.51	0.51	0.50	0.54	0.47	0.46	0.50	0.48	0.47	0.51
Dibenzo(a,c)anthracene	ng/m^3	0.50	0.48	0.51	0.49	0.48	0.51	0.51	0.50	0.54	0.47	0.46	0.50	0.48	0.47	0.51
Dibenzo(a,e)pyrene	ng/m^3	1.00	0.96	1.03	0.98	0.96	1.02	1.02	1.00	1.08	0.95	0.93	0.99	0.96	0.95	1.02
Fluoranthene	ng/m^3	0.70	0.96	0.72	0.68	0.67	0.72	0.41	0.40	0.32	0.57	0.56	0.40	0.38	0.57	0.41
Fluorene	ng/m^3	0.90	1.72	0.92	0.98	1.05	1.13	0.71	0.80	0.65	0.57	0.84	0.50	0.67	1.04	0.72
Indeno(1,2,3-cd)Pyrene	ng/m^3	0.25	0.29	0.26	0.24	0.24	0.26	0.26	0.25	0.27	0.24	0.23	0.25	0.24	0.24	0.26
Naphthalene	ng/m^3	27.41	35.99	29.69	31.76	36.10	39.59	17.45	14.35	15.48	15.80	14.30	12.81	17.92	15.66	17.30
Perylene	ng/m^3	0.50	0.48	0.51	0.49	0.48	0.51	0.51	0.50	0.54	0.47	0.46	0.50	0.48	0.47	0.51
Phenanthrene	ng/m^3	2.09	3.63	2.26	2.05	2.30	2.35	1.43	1.61	1.29	1.61	2.04	1.19	1.44	2.66	1.74
Picene	ng/m^3	0.50	0.48	0.51	0.49	0.48	0.51	0.51	0.50	0.54	0.47	0.46	0.50	0.48	0.47	0.51
Pyrene	ng/m^3	0.60	1.05	0.62	0.49	0.58	0.51	0.26	0.30	0.27	0.47	0.56	0.30	0.29	0.66	0.26
Tetralin	ng/m^3	2.29	3.44	4.42	2.25	3.45	3.79	1.63	1.61	1.83	1.04	1.02	1.09	1.34	1.90	1.95
Benzo(a)Pyrene	ng/m^3	0.25	0.44	0.31	0.11	0.26	0.20	0.04	0.05	0.05	0.06	0.09	0.00	0.05	0.06	0.05
Total PAH[4]	ng/m^3	72.21	89.69	82.60	76.38	85.10	93.34	54.02	50.67	52.53	48.90	46.76	44.56	52.82	54.03	55.65

Table 5: Summary of Results - VOCs

St Marys Cement (1804600)

Contaminant	Units	Baseline											
		30-Sep-18			1-Oct-18			2-Oct-18			4-Oct-18		
		OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
		Background	Background	Background	Background	Background	Background	Background	Background	Background	Upwind	Background	Background
2-Propanone	µg/m³	5.58	5.86	9.71	6.67	3.63	4.15	3.82	4.46	4.94	6.43	6.43	2.49
Chloromethane	µg/m³	0.91	0.91	0.89	0.93	0.91	0.89	0.89	0.87	0.93	0.93	0.93	1.03
Vinyl Chloride	µg/m³	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Chloroethane	µg/m³	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Methyl Ethyl Ketone (2-Butanone)	µg/m³	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.68
cis-1,2-Dichloroethylene	µg/m³	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
trans-1,2-Dichloroethylene	µg/m³	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Methylene Chloride(Dichloromethane)	µg/m³	0.41	0.41	0.63	0.82	0.33	0.39	0.38	0.48	0.37	0.39	0.39	0.54
Chloroform	µg/m³	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Carbon Tetrachloride	µg/m³	0.75	0.75	0.73	0.80	0.87	0.87	0.77	0.79	0.82	0.64	0.64	0.82
1,1-Dichloroethane	µg/m³	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
1,2-Dichloroethane	µg/m³	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.06	0.06	0.13
Ethylene Dibromide	µg/m³	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
1,1,1-Trichloroethane	µg/m³	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.27	0.27	0.27
1,1,2-Trichloroethane	µg/m³	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
1,1,2,2-Tetrachloroethane	µg/m³	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
1,2-Dichloropropane	µg/m³	0.46	0.24	0.24	0.44	0.24	0.24	0.24	0.24	0.35	0.24	0.24	0.24
Bromoform	µg/m³	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
Bromomethane	µg/m³	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
Bromodichloromethane	µg/m³	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34
Dibromochloromethane	µg/m³	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
Trichloroethylene	µg/m³	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.27	0.27	0.27
Tetrachloroethylene	µg/m³	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.34	0.34	0.34
Benzene	µg/m³	1.95	0.36	0.40	0.42	0.22	0.30	0.35	0.30	0.31	0.24	0.24	0.73
Toluene	µg/m³	0.63	0.80	0.76	0.78	0.36	0.35	0.55	0.68	0.56	0.40	0.40	1.03
Ethylbenzene	µg/m³	0.22	0.22	0.22	0.22	0.32	0.22	0.22	0.22	0.22	0.22	0.22	0.22
p+m-Xylene	µg/m³	0.43	0.43	0.43	0.43	1.17	0.43	0.43	0.52	0.43	0.43	0.43	0.48
o-Xylene	µg/m³	0.22	0.22	0.22	0.22	0.37	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Styrene	µg/m³	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Chlorobenzene	µg/m³	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Cumene (Isopropylbenzene)	µg/m³	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46
Total Xylenes	µg/m³	2.60	2.60	2.60	2.60	6.07	2.60	2.60	2.60	2.60	2.60	2.60	2.60
1,1,1,2-Tetrachloroethane	µg/m³	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14

NOTE: All below detectable results

Table 5: Summary of Results - VOCs

St Marys Cement (1804600)

Contaminant	Units	Alt Fuel											
		3-Oct-18			10-Oct-18			11-Oct-18			12-Oct-18		
		OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
		Downwind	Background	Upwind	Background	Background	Background	Upwind	Downwind	Upwind	Upwind	Downwind	Downwind
2-Propanone	$\mu g/m^3$	7.71	4.51	0.36	25.87	6.46	13.51	6.27	3.16	5.22	3.42	3.16	8.21
Chloromethane	$\mu g/m^3$	0.97	0.97	0.62	1.01	1.01	1.05	0.97	0.93	0.95	0.95	0.93	0.97
Vinyl Chloride	$\mu g/m^3$	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Chloroethane	$\mu g/m^3$	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Methyl Ethyl Ketone (2-Butanone)	$\mu g/m^3$	0.29	0.29	0.29	0.29	0.29	2.62	2.95	2.95	2.95	2.95	2.95	0.29
cis-1,2-Dichloroethylene	$\mu g/m^3$	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
trans-1,2-Dichloroethylene	$\mu g/m^3$	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Methylene Chloride(Dichloromethane)	$\mu g/m^3$	0.41	0.38	0.17	0.45	0.43	0.48	0.41	0.39	0.37	0.46	0.39	1.10
Chloroform	$\mu g/m^3$	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Carbon Tetrachloride	$\mu g/m^3$	0.86	0.85	0.31	0.75	0.80	0.78	0.82	0.84	0.83	0.87	0.84	0.79
1,1-Dichloroethane	$\mu g/m^3$	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
1,2-Dichloroethane	$\mu g/m^3$	0.06	0.06	0.04	0.06	0.05	0.06	0.07	0.06	0.06	0.06	0.06	0.07
Ethylene Dibromide	$\mu g/m^3$	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
1,1,1-Trichloroethane	$\mu g/m^3$	0.33	0.33	0.33	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
1,1,2-Trichloroethane	$\mu g/m^3$	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
1,1,2,2-Tetrachloroethane	$\mu g/m^3$	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
1,2-Dichloropropane	$\mu g/m^3$	0.24	0.24	0.24	0.24	0.24	0.24	0.28	0.24	0.30	0.24	0.24	0.41
Bromoform	$\mu g/m^3$	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
Bromomethane	$\mu g/m^3$	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
Bromodichloromethane	$\mu g/m^3$	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34
Dibromochloromethane	$\mu g/m^3$	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
Trichloroethylene	$\mu g/m^3$	0.32	0.32	0.32	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Tetrachloroethylene	$\mu g/m^3$	0.56	0.41	0.41	0.34	0.34	0.34	1.34	0.34	0.34	0.34	0.34	0.34
Benzene	$\mu g/m^3$	0.31	0.33	0.16	0.46	0.27	0.62	0.22	0.24	0.24	0.23	0.24	0.41
Toluene	$\mu g/m^3$	0.49	0.54	0.19	0.91	0.96	1.24	0.56	0.55	0.40	0.39	0.55	0.72
Ethylbenzene	$\mu g/m^3$	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
p+m-Xylene	$\mu g/m^3$	0.43	0.43	0.43	0.69	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
o-Xylene	$\mu g/m^3$	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Styrene	$\mu g/m^3$	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Chlorobenzene	$\mu g/m^3$	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Cumene (Isopropylbenzene)	$\mu g/m^3$	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46
Total Xylenes	$\mu g/m^3$	2.60	2.60	2.60	2.78	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
1,1,1,2-Tetrachloroethane	$\mu g/m^3$	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14

Table 5: Summary of Results - VOCs

St Marys Cement (1804600)

		Alt Fuel									Baseline					
		4-Dec-18			5-Dec-18			6-Dec-18			7-Dec-18			8-Dec-18		
Contaminant	Units	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
		Upwind	Background	Downwind	Background	Background	Background	Upwind	Background	Downwind	Background	Upwind	Background	Background	Background	Background
2-Propanone	$\mu g/m^3$	2.47	7.22	2.49	4.25	4.79	Unrecovered Sample	3.99	3.16	2.44	2.11	5.25	1.95	3.80	3.80	1.73
Chloromethane	$\mu g/m^3$	1.07	1.07	1.03	1.16	1.11		1.16	1.11	1.16	1.13	1.16	1.09	1.16	1.18	1.11
Vinyl Chloride	$\mu g/m^3$	0.05	0.05	0.05	0.05	0.05		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Chloroethane	$\mu g/m^3$	0.79	0.79	0.79	0.79	0.79		0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Methyl Ethyl Ketone (2-Butanone)	$\mu g/m^3$	0.80	1.21	0.68	1.41	1.30		1.41	0.88	1.80	0.68	0.83	0.56	1.09	1.06	0.77
cis-1,2-Dichloroethylene	$\mu g/m^3$	0.20	0.20	0.20	0.20	0.20		0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
trans-1,2-Dichloroethylene	$\mu g/m^3$	0.40	0.40	0.40	0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Methylene Chloride(Dichloromethane)	$\mu g/m^3$	0.59	0.57	0.54	0.61	0.66		0.63	0.53	0.64	0.60	0.67	0.47	0.67	0.52	0.53
Chloroform	$\mu g/m^3$	0.20	0.20	0.20	0.20	0.20		0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Carbon Tetrachloride	$\mu g/m^3$	0.79	0.80	0.82	0.78	0.77		0.89	0.92	0.93	0.89	0.96	0.94	0.78	0.89	0.99
1,1-Dichloroethane	$\mu g/m^3$	0.20	0.20	0.20	0.20	0.20		0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
1,2-Dichloroethane	$\mu g/m^3$	0.13	0.13	0.13	0.13	0.14		0.14	0.14	0.14	0.13	0.13	0.13	0.13	0.13	0.14
Ethylene Dibromide	$\mu g/m^3$	0.08	0.08	0.08	0.08	0.08		0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
1,1,1-Trichloroethane	$\mu g/m^3$	0.27	0.27	0.27	0.27	0.27		0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
1,1,2-Trichloroethane	$\mu g/m^3$	0.07	0.07	0.07	0.07	0.07		0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
1,1,2,2-Tetrachloroethane	$\mu g/m^3$	0.02	0.02	0.02	0.02	0.02		0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
1,2-Dichloropropane	$\mu g/m^3$	0.24	0.24	0.24	0.24	0.24		0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Bromoform	$\mu g/m^3$	0.52	0.52	0.52	0.52	0.52		0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
Bromomethane	$\mu g/m^3$	0.39	0.39	0.39	0.39	0.39		0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
Bromodichloromethane	$\mu g/m^3$	1.34	1.34	1.34	1.34	1.34		1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34
Dibromochloromethane	$\mu g/m^3$	1.70	1.70	1.70	1.70	1.70		1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
Trichloroethylene	$\mu g/m^3$	0.27	0.27	0.27	0.27	0.27		0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Tetrachloroethylene	$\mu g/m^3$	0.34	0.34	0.34	0.34	0.34		0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Benzene	$\mu g/m^3$	0.56	0.62	0.73	0.62	0.86		0.49	0.53	0.51	0.44	0.40	0.40	0.58	0.51	0.55
Toluene	$\mu g/m^3$	0.71	0.87	1.03	1.22	1.62		0.63	0.61	0.79	0.33	0.32	0.26	0.62	0.56	0.58
Ethylbenzene	$\mu g/m^3$	0.22	0.22	0.22	0.22	0.29		0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
p+m-Xylene	$\mu g/m^3$	0.43	0.56	0.48	0.56	0.91		0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
o-Xylene	$\mu g/m^3$	0.22	0.22	0.22	0.22	0.35		0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Styrene	$\mu g/m^3$	0.23	0.21	0.21	0.21	0.93		0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Chlorobenzene	$\mu g/m^3$	0.23	0.23	0.23	0.23	0.23		0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Cumene (Isopropylbenzene)	$\mu g/m^3$	2.46	2.46	2.46	2.46	2.46		2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46
Total Xylenes	$\mu g/m^3$	2.60	2.60	2.60	2.95	5.03		2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
1,1,1,2-Tetrachloroethane	$\mu g/m^3$	0.14	0.14	0.14	0.14	0.14		0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14

Table 6: Summary of Results - Mercury

		Baseline											
		30-Sep-18			1-Oct-18			2-Oct-18			4-Oct-18		
Contaminant	Units	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
		Background	Background	Background	Background	Background	Background	Background	Background	Background	Upwind	Background	Background
Mercury	($\mu g/m^3$)	Invalid	0.002	0.002	0.002	0.002	Invalid	0.002	0.002	0.002	0.002	0.002	0.002

All below detectable results

Table 6: Summary of R

		Alt Fuel											
		3-Oct-18			10-Oct-18			11-Oct-18			12-Oct-18		
Contaminant	Units	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
		Downwind	Background	Upwind	Background	Background	Background	Upwind	Downwind	Upwind	Upwind	Downwind	Downwind
Mercury	(μg/m^3)	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.002

Table 6: Summary of R

Contaminant	Units	Alt Fuel									Baseline					
		4-Dec-18			5-Dec-18			6-Dec-18			7-Dec-18			8-Dec-18		
		OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
		Uwind	Background	Downwind	Background	Background	Background	Upwind	Background	Downwind	Background	Upwind	Background	Background	Background	Background
Mercury	(μg/m^3)	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002	0.002	0.002

APPENDIX A

PRE-TEST PLAN

ST MARYS CEMENT INC. (CANADA)

BOWMANVILLE, ONTARIO

PRE-TEST PLAN
COMPLIANCE SOURCE TESTING ECA # 4614-826K9W
RWDI #1702401
August 30, 2018

SUBMITTED TO
Ministry of the Environment, Conservation and Parks
Technology Standards Section
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APPENDICES

1 INTRODUCTION

1.1 Summary of Test Program

RWDI AIR Inc. (RWDI) has been retained by St. Marys Cement Inc. (Canada), (St Marys) to conduct emission sampling on the kiln exhaust at their facility in Bowmanville, Ontario. The testing is required under the Environmental Compliance Approval (ECA) #4614-826K9W. The ECA is provided in Appendix A. Also required as part of the demonstration ECA is an Ambient Monitoring Program, which has also been included in this pre-test plan.

The ECA permit requires the following:

1. Stack Testing under Baseline Conditions;
1. Stack Testing with Approved substitution rate of Alternative Fuels; and
2. Ambient Air Quality Monitoring Program.

This stack testing study will consist of the following parameters, as listed in the Schedule B2 of the ECA. The testing will consist of three tests for each parameter:

- Total particulate matter (TPM)
- PM_{10}, and $PM_{2.5}$ (filterable)
- Metals (as listed in ECA)
- Semi-Volatile Organic Compounds (SVOC's) (listed as Polycyclic Organic Matter in ECA)
- Dioxins, Furans and Dioxin-like PCB's (as listed in ECA)
- Chlorinated Organics (as listed in ECA)
- Hydrogen chloride (HCl)
- Ammonia (NH_3)
- Volatile Organic Matter (VOC's as listed in the ECA)
- Oxygen (O_2)
- Carbon dioxide (CO_2)
- Carbon Monoxide (CO)

Total calcium and total iron measured in the Method 29 train will be used to calculate calcium oxide and ferric oxide, with adjusted for Molecular weight. Nitrogen Oxides and Sulphur Dioxide will be monitored by the facilities Continuous Emission Monitor (CEM) system. The facility completes an annual Relative Accuracy Test Audit, a copy of the most recent RATA report will be included in the final stack testing report.

This ambient air quality program will consist of the following parameters, as listed in the Schedule B1 of the ECA.

- Metals (as listed in ECA)
- Semi-Volatile Organic Compounds (SVOC's) (listed as Polycyclic Organic Matter in ECA)
- Dioxins and Furans (as listed in ECA)
- Volatile Organic Matter (VOC's as listed in the ECA)

1.2 Schedule

The testing is currently scheduled to take place during a two-week period starting September 30th to October 14th, 2018. Fifteen days' notice will be provided to the Ministry of the Environment, Conservation and Parks (MECP) via e-mail.

Testing will be conducted under the following schedule:

Baseline Condition

Test Day 1(Sept 30) - Test 1 for TPM / Metals Train
- Test 1 for $PM_{10}/PM_{2.5}$
- Test 1 for (Dioxins/Furans and SVOC's)
- Tests 1 for VOC's, HCl and Ammonia
- O_2, CO, CO_2 continuous during above testing

Test Day 2 (Oct 1) - Test 2 for TPM / Metals Train
- Test 2 for $PM_{10}/PM_{2.5}$
- Test 2 for (Dioxins/Furans and SVOC's)
- Tests 2 for VOC's, HCl and Ammonia
- O_2, CO, CO_2 continuous during above testing

Test Day 3(Oct 2) - Test 3 for TPM / Metals Train
- Test 3 for $PM_{10}/PM_{2.5}$
- Test 3 for (Dioxins/Furans and SVOC's)
- Tests 3 for VOC's, HCl and Ammonia
- O_2, CO, CO_2 continuous during above testing

Firing Alternative Fuels Condition

Test Day 4(Oct 3) - Test 1 for TPM / Metals Train
- Test 1 for $PM_{10}/PM_{2.5}$
- Test 1 for (Dioxins/Furans and SVOC's)
- Tests 1 for VOC's, HCl and Ammonia
- O_2, CO, CO_2 continuous during above testing

Test Day 2(Oct 4) - Test 2 for TPM / Metals Train
- Test 2 for $PM_{10}/PM_{2.5}$
- Test 2 for (Dioxins/Furans and SVOC's)
- Tests 2 for VOC's, HCl and Ammonia
- O_2, CO, CO_2 continuous during above testing

Test Day 3(Oct 5) - Test 3 for TPM / Metals Train
- Test 3 for $PM_{10}/PM_{2.5}$/CPM train
- Test 3 for (Dioxins/Furans and SVOC's)
- Tests 3 for VOC's, HCl and Ammonia
- O_2, CO, CO_2 continuous during above testing

1.3 Test Program Organization

Details with respect to the key individuals involved with the stack sampling survey are provided below.

Company Name:	St. Marys Cement Inc. (Canada)
Company Address:	55 Industrial Street
	Toronto, Ontario
Plant Location:	400 Waverly Road
	Bowmanville, Ontario
Plant Coordinator:	Luis Urbina
Telephone Number:	905 623 3341 Ext 248
E-mail:	luis.urbina@vcimentos.com
MECP District Office:	York-Durham
Sampling Company:	RWDI AIR Inc.
Project Manager:	Kirk Easto
Telephone Number:	519-823-1311 x2482
Cellular Number:	705-772-5944
Fax Number:	519-823-1316
Email:	kirk.easto@rwdi.com
Laboratory:	Maxxam Analytics
Project Manager:	Clayton Johnson
Telephone Number:	905-817-5769

2 SOURCE DESCRIPTION

2.1 Plant Location

The Bowmanville facility is located along Lake Ontario, south of Highway 401 at Waverly Road.

2.2 Facility Description

The fundamental process of cement manufacturing consists of combining materials bearing calcium oxide, silica, alumina and iron oxide at high temperatures to produce cement clinker. The clinker is subsequently ground with finishing materials such as gypsum, limestone, clay and slag to produce cement.

The cement plant operates 12 months per year typically on 24 hours per day, 7 days per week schedule, with a maximum production capacity of 6,300 tonnes of clinker per day.

The proposed fuel supply during the demonstration project would be a blend of permitted fuel materials. This blend would consist: of “Alternative Fuel” as defined in ECA 4614-826K9W being 5.5 tonnes/hour of post-composting plastic polymers and woody residuals as well as 6.5 tonnes/hour of plastic polymers, paper fibres and woody residuals derived from industrial and/or post consumer sources; as well as up to 4 tonnes/hour of "Low Carbon Alternative Fuels" as defined in ECA 0469-9YUNSK. These materials would be received, shredded and blended off-site at a permitted facility, prior to delivery to the demonstration Facility.

A more detailed process description and process flow diagram for the Bowmanville Plant are included in Appendix B.

3 TEST PROGRAM

3.1 Sample Location

The sampling location on the kiln stack is located 84.5 metres above grade equipped with a proper sampling platform and four 90º offset sample ports. This sampling location is considered 'ideal' as per the Ontario Source Test Code Method 1 since the nearest flow disturbances were greater than eight (8) duct diameters downstream and two (2) duct diameters upstream. A diagram of the stack is provided in Appendix B. The stack height is 105 m, the diameter at the testing location is 5.48 m and the outside diameter is 5.68 m, including the layer of insulation.

3.2 Testing Methodology

The following table summarizes the test methodologies that will be followed during this program.

Table 1: Summary of Test Methodology

Parameter	Proposed Reference Test Method
Flow Rate, Temperature, Moisture	OSTC [1] Methods ON-1 to ON-4
Total Particulate Matter	OSTC [1] Method ON-5
Metals (including Hg)	US EPA [2] Method 29
PM_{10}, and $PM_{2.5}$	US EPA [2] Method 201A
SVOC's	Environment Canada RM/2
Dioxins and Furans	Environment Canada RM/2
Chlorinated Organics	Environment Canada RM/2
Oxygen and Carbon Dioxide	US EPA [2] Method 3A
Carbon Monoxide	US EPA Method 10
Volatile Organic Matter	US EPA SW 846 0030 VOST
Hydrogen Chloride and Ammonia	US EPA [2] Method 26 (non-isokinetic)

Notes: [1] OSTC = Ontario Source Testing Code, version 3
[2] USEPA = United States Environmental Protection Agency

3.3 Description of Testing Methodology

The following section provides brief descriptions of the proposed sampling methods and discusses any proposed modifications to the reference test methods.

Stack Velocity, Temperature, and Volumetric Flow Rate Determination

The exhaust velocities and flow rates will be determined following the Ontario Source Testing Code version 3 (OSTC) Method ON-2, "Determination of Stack Gas Velocity and Volumetric Flow Rate". Velocity measurements will be taken with a pre-calibrated Stausscheibe type (S-Type) pitot tube and incline manometer. Volumetric flow rates will be determined following the equal area method as outlined in OSTC Method ON-2. Temperature measurements will be made simultaneously with the velocity measurements and will be conducted using a chromel-alumel type "k" thermocouple in conjunction with a digital temperature indicator.

The dry molecular weight of the stack gas will be determined following calculations outlined in OSTC Method ON-3, "Determination of Molecular Weight of Dry Stack Gas". Stack moisture content will be determined through direct condensation and according to OSTC Method ON-4, "Determination of Moisture Content of Stack Gas".

Sampling for Total Particulate Matter and Metals

Sampling for TPM and metals on the kiln will be performed in accordance with OSTC Method 5, "Sampling of Total Particulate Matter from Stationary Sources" and U.S. EPA Method 29 "Determination of Metals Emissions from Stationary Sources", respectively. Sampling will be conducted using an Environmental Supply C-5000 Source Sampling System. Both TPM and metals will be sampled concurrently using the same sampling train. Triplicate sampling runs will be conducted. Calcium Oxide will be analyzed as calcium and Iron oxide will be analyzed as iron.

The sample will be drawn through a glass lined sample probe and quartz fibre filter, which will be maintained at a temperature of 120 ± 14°C (248 ± 25°F). The sample will then be introduced into the impinger train. The impinger train will include two 5% HNO_3/10% H_2O_2 absorbing solution impingers, one empty impinger, two impingers containing $KMnO_4$ solution and one impinger containing silica gel.

Upon completion of the test, the sampling train will be recovered, as in the procedures detailed in the reference method, and the samples will be packaged for transport to Maxxam Analytical Services in Burlington, Ontario for analysis.

> Testing will be conducted over 32 points, 7.5 minutes per point and 2.5 minutes reading per point. The total test time will be 240 minutes with approximate sample volumes of 180 cubic feet.

Sampling for PM_{10} and $PM_{2.5}$

Sampling of PM_{10} and $PM_{2.5}$ will be performed in accordance with U.S EPA Method 201A. Sampling will be conducted using an Environmental Supply C-5000 Source Sampling System, and in-stack sizing cyclones. A gas sample will be extracted at a constant flow rate through an in-stack cyclone. The sizing cyclone separates particles with nominal aerodynamic diameters of 10 micrometers and 2.5 micrometers. The particulate mass is determined gravimetrically.

Sample duration for the PM_{10} and $PM_{2.5}$ tests will be 2 hours, collected over 24 points

Sampling for Semi-Volatile Organic Compounds and Dioxin and Furan Isomers

Sampling for SVOC's and dioxin and furan isomers, dioxin like PCB's and Chlorinated Organics will be done in accordance with Environment Canada RM/2. Both compound categories and will be determined concurrently using the same sampling train. Triplicate sampling runs will be conducted.

The sample will be drawn through a glass lined sample probe and proofed glass fibre filter. Both of these will be maintained at a temperature of 120 ± 14°C (248 ± 25°F). The sample will then pass through a water cooled condenser and an XAD-2 absorbent module. The temperature of the XAD-2 module will be kept below 20°C. The stack gas sample will then be introduced into the impinger train. The impinger train will be configured as specified in the reference method. As indicated in the method, the water impingers will not be recovered for analysis.

Upon completion of the test, the samples will be kept cool and delivered to Maxxam Analytical Services in Burlington, Ontario. The filter, XAD-2 module and all rinses will be analysed for the target compounds using high resolution mass spectrometry.

Testing will be conducted over 32 points, 7.5 minutes per point and 2.5 minutes reading per point. The total test time will be 240 minutes with approximate sample volumes of 180 cubic feet.

Sampling for Hydrogen Chloride and Ammonia

Sampling for hydrogen chloride and ammonia will be completed following U.S. EPA Method 26 "Determination of Hydrogen Halide and Halogen Emissions from Stationary Sources - Non-Isokinetic Method". The sampling will be conducted using a midget impinger sampling train. The sample will be drawn through a Teflon lined probe, glass fibre filter and three-way stopcock which will be maintained at a temperature of 120 ± 14°C (248 ± 25°F). The sample will then enter the impinger train which consists of three impingers. The impingers in order include, two (2) acidic impingers, and a final silica impinger to dry the sample.

Upon completion of the testing, samples will be kept cool and submitted to Maxxam Analytical Services in Burlington, Ontario for analysis for hydrogen chloride and ammonia.

Testing will be conducted as a single located near the centre of the stack and collected over one (1) hour.

SAMPLING FOR VOLATILE ORGANIC COMPOUNDS

Sampling for volatile organic compounds (VOC) will be conducted using a volatile organic sampling train (VOST) following U.S. EPA SW846 Method 0030. Sample gas will be collected on a pair of adsorbent tubes, the first containing Tenex, and the second, a combination of Tenex/charcoal. Since it is expected that no visible condensate will buildup in the knock out flask located after the first tube, it will not be recovered for analysis. As done in the past sampling projects at St. Marys, one pair of tubes will make up one test, and three tests will be performed. Samples will be submitted to Maxxam Analytical Services for analysis.

Each set of tubes will be sampled over a 60-minute period at 0.25 L/min. To ensure that no breakthrough has occurred through the VOST tubes, one test will involve analysing the tubes separately.

Continuous Emissions Monitoring for O_2, CO and CO_2

Testing for O_2, CO and CO_2 will be accomplished using continuous emission monitors (CEMs). The exhaust gas sample will be withdrawn from a single point at the centre of the stack using a stainless steel probe. The sample will then proceed to a heated filter, where particulate matter is removed, and then transferred via a heated Teflon line to a sample conditioner. The Teflon line will be heated to 120°C (250°F) to prevent any condensation. The sample conditioner will remove any moisture in the exhaust. The sample will then be routed through a manifold system and introduced to the individual CEM's for measurement.

Prior to testing, sample system bias checks and instrument linearity checks (calibration error) will be conducted. In addition, the analysers will be calibrated (zeroed and span checked) at the completion of each run. Data acquisition will be provided using a National Instruments data logger system programmed to collect and record data at 1-second intervals. Average 1-minute concentrations will be calculated from the 1-second measurements.

3.4 Ambient Monitoring Methodology

The ambient air quality monitoring program is required under section 7 of the ECA. Three locations will be chosen based on historical meteorological data and air dispersion modelling of the kiln stack. The three locations will ensure both upwind and downwind concentrations from the site on each day of testing. The ambient program will provide 24-hour measurements for the parameters listed in Schedule B1, during both the base line and alternative fuels stack testing days.

The three locations are present in Appendix C. Ambient station #3 represents the most frequent location of the maximum POI in the predominant wind direction, based on dispersion modelling. The other two locations offer an upwind sample (station #1) and an alternative downwind location (station #2).

The three sites have been visited and reviewed to ensure that there no physical obstruction for the samplers, or any possible contaminating sources near the samplers that could influence the results of the program. During the sampling program, wind directions and speeds will be monitored by the already existing meteorological station located at the facility.

Ambient Sampling for Metals

Sampling for the metals listed in schedule B1 of the ECA will be completed following U.S. EPA Method IO2. The metals analyzed will follow procedures listed in IO3 and IO5. The sample will be collected using a High Volume sampler (Hi-Vol). Each Hi-Vol is equipped with a flow controller, which ensures a flow rate of 40 cubic feet per minute (CFM) and a timer for starting and stopping each sample. Each Hi-Vol is calibrated before the program ensure accuracy and validity of its data.

Calcium oxide will be analyzed as total calcium and iron oxide will be analyzed as total iron.

Mercury in gaseous form, will be collected separately from above. Collection media will be the same as listed in NIOSH Method 6009. Two tubes will be connected in series and analyzed separately to ensure no breakthrough has occurred. A small filter will be placed in front of the tubes to remove any particulate based mercury. The tubes will be placed at a height of 1.2m with air collected at a rate of 1.0 litre per minute. The sample rate will be controlled with a rotameter and sample volume measured with a calibrated dry gas meter. After completion of the sample the tubes will be recovered and kept cool prior to analysis.

Each location will be on a 24-hour sampling schedule, ensuring the media switch is not conducted while the stack testing is occurring.

Ambient Sampling PAH's and Dioxins and Furans

Sampling for PAH's and Dioxins, Furans listed in Schedule B1 will be conducted using General Metal Works PS-1 samplers which are listed as reference devices for U.S. EPA Methods TO-9 and TO-13. The samplers use a collection filter that is 'backed-up' by a polyurethane foam (PUF) plug. The airborne compounds present in the particulate phase are collected on the filter. Any compounds present in the vapour phase are absorbed in the PUF plug. Each PUF sampler is equipped with a flow controller, which can sustain 8 cubic feet per minute (CFM) of flow over the sampling period, and a timer for starting and stopping each sample. Each PUF sampler is calibrated before the program to ensure accuracy and validity of its data.

Each location will be on a 24-hour sampling schedule, ensuring the media switch is not conducted while the stack testing is occurring.

Ambient Sampling for VOC's

Sampling for the VOC's listed in Schedule B1 will be collected in specially prepared canisters as specified in EPA Compendium Method TO-14/15. Flow controllers are used to maintain a constant flow rate over the sampling period of 24 hours. The flow controllers are equipped with stainless steel sintered filters and stainless steel pressure gauges to ensure that the canisters remain under slightly negative pressure at the completion of each testing period. These controllers also are equipped with automated air sampling timers that can be set to allow the valve in the flow controller to open and close over a given time period. These flow controllers are checked with a flow calibrator before the start of the program to ensure a suitable flow rate for the sampling period.

Each location will be on a 24-hour sampling schedule, ensuring the media switch is not conducted while the stack testing is occurring.

3.5 Process Data

Operating conditions during the sampling will be monitored by St. Marys personnel. All equipment will be operated under normal (desired) conditions.

At the time of the sampling program, St. Marys will be operating as close to maximum production as possible. The normal production rate for the facility is 5,700 tonnes/day of clinker. Due to the nature of the process, St. Marys will try and keep the process as stable as possible over the testing program as operating at a constant rate is the ideal process scenario for St. Marys. Continuously making changes to the process can affect the quality of St. Marys end products. St. Marys will monitor the Kiln Feed Uniformity Index throughout the program and will monitor parameters such as kiln RPM, kiln temperature and process variability. This information will be included in the final report. Other process conditions that will be monitored during the sampling program and will be included in an Appendix in the final report are:

- Oxygen;
- Opacity;
- Nitrogen Oxides;
- Sulphur Dioxide;
- Hourly combined raw feed;
- Hourly Alternative Fuels and Conventional Fuels firing rates in the kiln and calciner;
- Hourly clinker production;
- The concentration of the oxygen and Carbon Monoxide in the backend of the kiln and calciner down comer duct;
- Temperature of the gases leaving the kiln;
- Temperature of the gases leaving the calciner.

Radio contact will be kept between the process operators and the sampling team. A member of the RWDI sampling team will contact the operator before each test, to ensure that the process is at normal (desired) operating conditions.

4 INTERNAL QUALITY ASSURANCE/QUALITY CONTROL ACTIVITIES

4.1 Overview

Applicable quality assurance measures will be implemented during both the stack and ambient sampling programs to ensure the integrity of the results. These measures will include detailed documentation of field data, equipment calibrations for all measured parameters, completion of Chain of Custody forms when submitting laboratory samples, and submission of field blank samples to the laboratories.

Quality control procedures specific to the CEM monitoring will include linearity checks, to determine the instrument performance, and reproducibility checks prior to its use in the field. Regular performance checks on the analyser will also be carried out during the testing program by performing hourly zero checks and span calibration checks using primary gas standards. Sample system bias checks will also be conducted. These checks will be used to verify the ongoing precision of the monitor and sampling system over time. Pollutant-free (zero) air will be introduced to perform the zero checks, followed by a known calibration (span) gas into the monitor. The response of the monitor to pollutant-free air and the corresponding sensitivity to the span gas will be recorded regularly during the tests.

All samplers will be bench tested and calibrated in RWDI's Guelph office prior to field deployment and, in many cases, calibrated again in the field before use. For each sample collected with a Method 5 sampling train, both pre- and post- leak checks will be conducted by plugging the inlet and drawing a vacuum of 380 mm of water for at least one minute. Dry gas meter reading leakage rates greater than 4% of the average sampling rate or 0.00057 m^3/min (0.02 cfm), whichever is less, are unacceptable. Similar leak check procedures for the Pitot tube and pressure lines will be conducted. A number of blanks are included in the methods and will be submitted for analyses as well

Chain of custody forms will be completed and submitted along with the samples to the laboratory. All sampling media will be provided or prepared by the laboratory responsible for its subsequent analysis. All quality control and quality assurance measures will be recorded and will be included in the final report.

4.2 Sample Identification and Custody

The following person is responsible for sample handling and recording during this study:

Person Responsible:	Kirk Easto, RWDI AIR Inc.
Sample Identification:	Kirk Easto, RWDI AIR Inc.
Sample Log Sheet:	Kirk Easto, RWDI AIR Inc.

5 REPORTING REQUIREMENTS

5.1 Report Format – Stack Testing

The stack testing report will include, as a minimum, the following:

- an executive summary;
- date, time and duration of each test;
- records of operating conditions;
- average of emission concentrations, rates, and calculations;
- Records of operating conditions; including a summary of the results of the Raw Feed and Fuels Analysis and Monitoring Program as required by Condition 4 of the ECA (separate report);
- Records produced by the continuous monitoring systems during the demonstration project;
- Summary table showing measured stack concentrations and Operating Conditions compared to the applicable limits set out in Schedule A1 and A2;

Included in a separate report will be:

- Results of air dispersion calculations in accordance with regulation 419/05.
- Summary table comparing the measured results to the ESDM report and Performance limits;
- A comparison of the measured emission results collected during the baseline and alternative fuels firing conditions. The comparison will provide a description and possible explanation of any statistically significant changes in the measured values.

5.2 Report Format – Ambient Monitoring Program

The ambient monitoring report will include, as a minimum, the following:

- an executive summary;
- date, time and duration of each test;
- Records of operating conditions; including a summary of the results of the Raw Feed and Fuels Analysis and Monitoring Program as required by Condition 4 of the ECA (separate report);

- Information on the exact location of samplers, including the analysis to site them. A map will be provided showing the locations;
- A description of the specifications of the monitors used in the ambient monitoring program;
- A description of the specifications of the meteorological equipment used in the ambient monitoring program;

Included in a separate report will be:

- Results of ambient air monitoring program for the Test Contaminants listed in B1;
- Summary table comparing the measured results to the ESDM report and Performance limits;
- A comparison of the measured results collected during the baseline and alternative fuels firing conditions. The comparison will provide a description and possible explanation of any statistically significant changes in the measured values.

6 SAFETY

The following table outlines the additional safety requirements for this testing as identified by RWDI and St. Marys.

Head Protection	Required
Foot Protection	Required
Eye Protection	Required
Hearing Protection	Required
Safety Belt or Harness	Not Required
Respiratory Equipment	Not Required
Other Protective Clothing or Equipment	Not required
Safety Training Session	Required
Date of Session, if Required	First day of testing program
Sampling Location	Stack Platform
Temperature of Sampling Location	Ambient
Work Area	Ambient
Other Safety Requirements	n/a

7 PERSONNEL RESPONSIBILITIES AND TEST SCHEDULE

7.1 Test Site Organization

The following individuals are responsible for the key tasks during the survey.

Task	**Individual**
Project Management:	Mr. Kirk Easto, RWDI AIR Inc.
Test Preparation/Site Restoration:	Luis Urbina, St. Marys Cement Inc.
Modifications to Facility/Services:	Luis Urbina, St. Marys Cement Inc.
Sample Site Accessibility:	Luis Urbina, St. Marys Cement Inc.
Data Recovery:	Mr. Kirk Easto, RWDI AIR Inc.
Sample Schedule:	Mr. Kirk Easto, RWDI AIR Inc.

7.2 Test Preparations

Personnel at the St. Marys plant will ensure that the plant is operating at acceptable capacity during the source testing. St. Marys personnel will also ensure that RWDI field crew have access to shelter, sampling ports and electrical power.

APPENDIX C

Ontario

Ministry of the Environment
Ministère de l'Environnement

ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER 4614-826K9W
Issue Date: November 5, 2014

St. Marys Cement Inc. (Canada)
410 Waverly Rd R.R. 2
Bowmanville, Ontario
L1C 3K3

Site Location: 400 Waverly Road South
Clarington, Ontario

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, *R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:*

A time-limited Demonstration Project to gather site specific air quality data, where up to 30% of the conventional fuel, based on total energy input, is substituted with the following Alternative Fuels:

Alternative Fuel	Description	Maximum Input Rate (tonnes/hour)
Post-composting plastic polymers and woody residuals.	Shredded and dried plastic film and other plastic materials and woody materials removed from finished compost.	5.5
Plastic polymers, paper fibres and woody residuals derived from industrial and/or post consumer sources.	Shredded plastic and other materials removed from post consumer recycling or from industrial manufacturing process.	6.5

all in accordance with the application for an Approval (Air & Noise), signed by Martin Vroegh and all supporting information, including Emission Summary and Dispersion Modelling Report dated September 29, 2008, prepared by Pottinger Gaherty Environmental Consultants.

For the purpose of this environmental compliance approval, the following definitions apply:

1. "Approval" means this Environmental Compliance Approval, including the application and all supporting documentation;

2. "Alternative Fuel" means plastic polymers, paper fibres and woody residuals derived from industrial and/or post consumer sources, received as single streams, or blends of these material types, classified as Municipal Solid Waste under Ontario Regulation 347, written under the EPA, to be used as a substitute fuel source in the Cement Kiln;

3. "Ambient Air Quality Monitoring Program" means the ambient air quality monitoring program outlined in the report titled "Ambient Air Sampling Program", prepared for St. Marys Cement Inc, by Pottinger Gaherty Environmental Consultants Ltd., July 2008 and Addendum dated December *10, 2008, signed* by Bridget Mills;

4. "Baseline Conditions" means operating conditions where only Conventional Fuel is used in the Cement Kiln;

5. "CEM System" means the continuous monitoring and recording systems used to measure the emissions from the Cement Kiln, as described in the Company's application, this Approval and in the supporting documentation referred to herein, to the extent approved by this Approval;

6. "Company" means St. Marys Cement Inc. (Canada) that is responsible for the construction or operation of the Facility and includes any successors and assigns;

7. "Cement Kiln" means the Cement Kiln, the Calciner and associated control equipment and continuous emissions monitoring systems, firing Conventional Fuel and Alternative Fuel, described in the Company's application, this Approval and in the supporting documentation referred to herein, to the extent approved by this Approval;

8. "Conventional Fuel" means solid fuels such as, petroleum coke and coal;

9. "Demonstration Project" means the demonstration project where up to 30 % of Conventional Fuel is substituted with Alternative Fuel in the Cement Kiln, as described in the Company's application, this Approval and in the supporting documentation referred to herein, to the extent approved by this Approval;

10. "District Manager" means the District Manager of the appropriate local district office of the Ministry, where the Facility is geographically located;

11. "EPA" means the <u>Environmental Protection Act</u>, R.S.O. 1990, c.E.19, as amended;

12. "Equipment" means the equipment and operations associated with the Demonstration Project, located on the property where the Cement Kiln is located, as described in the Company's application, this Approval and in the supporting documentation referred to herein, to the extent approved by this Approval;

13. "Facility" means the entire operation located on the property where the Equipment is located;

14. "Manager" means the Manager, Technology Standards Section, Standards Development Branch, who has been appointed under Section 5 of the EPA for the purposes of Section 11(1)2 of O.Reg. 419, or any other person who represents and carries out the duties of the Manager, Technology Standards Section, Standards Development Branch, as those duties relate to the conditions of this Approval;

15. "Manual" means a document or a set of documents that provide written instructions to staff of the Company;

16. "Ministry" means the ministry of the government of Ontario responsible for the EPA and includes all officials, employees or other persons acting on its behalf;

17. "Point of Impingement" means any point in the natural environment. The point of impingement for the purposes of verifying compliance with the EPA with respect to the Demonstration Project, shall be chosen as the point located outside the Company's property boundaries at which the highest concentration is expected to occur, when that concentration is calculated in accordance with a method accepted by the Director;

18. "Pre-test Information" means the information outlined in Section 1.1 of the Source Testing Code;

19. "Source Testing" means sampling and testing to measure emissions resulting from operating the Cement Kiln at a level of typical maximum production within the approved operating range of the Cement Kiln which satisfies paragraph 1 of subsection 11(1) of O. Reg. 419;

20. "Source Testing Code" means the Source Testing Code, Version 2, Report No. ARB-66-80, dated November 1980, prepared by the Ministry, as amended;

21. "Test Contaminants" means those contaminants set out in Schedules "B1" and "B2" attached to this Approval;

22. "Publication NPC-205" means the Ministry Publication NPC-205, "Sound level Limits for Stationary Sources in Class 1 & 2 Areas (Urban)", October, 1995 as amended; and

23. "Publication NPC-232" means the Ministry Publication NPC-232, "Sound Level Limits for Stationary Sources in Class 3 Areas (Rural)", October, 1995 as amended.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

OPERATION AND MAINTENANCE

1. (1) The Company shall ensure that the Facility is properly operated and maintained at all times while firing any amount of Alternative Fuel in the Cement Kiln during the Demonstration Project, so that operations of the Cement Kiln shall meet the operational limits set out in Schedule "A1". Alternative Fuel is to be stopped (following appropriate procedures) if one or more of Operational Limits is exceeded for more than one consecutive hour.

   (2) The Performance Objectives for emissions from the Cement Kiln Exhaust Stack are set out in Schedule "A2".

2. Unless otherwise approved in writing by the Director due to unforeseen delays in carrying out the Demonstration Project, the Company shall limit the combustion of Alternative Fuel in the Cement Kiln to the following:

   (1) Thirty (30) days for stack testing at the maximum fuel substitution (up to 30%);

   (2) Thirty (30) days for ramping up, stabilization, and ramping down.

3. The Company shall ensure that the Facility is properly operated and maintained at all times during the Demonstration Project. The Company shall:

   (1) prepare and update as necessary, prior to commencement of the Demonstration Project, a Design and Operations Manual specific to all aspects of the Facility, including the handling of Alternative Fuel and the use of Alternative Fuel in the Cement Kiln during the Demonstration Project, outlining the following:

      (a) operating and maintenance procedures in accordance with good engineering practices and as recommended by the equipment suppliers;

      (c) emergency procedures;

      (d) procedures for any record keeping activities relating to the operations of the Facility;

      (e) all appropriate measures to minimize odour, noise and dust emissions from all potential sources from the Facility;

   (2) implement the recommendations of the Design and Operations Manual during the Demonstration Project.

4. The Company shall, at all times, ensure that the noise emissions from the Facility comply with the limits set out in Ministry Publication NPC-205 or Ministry Publication NPC-232, as applicable, during the Demonstration Project.

RAW FEED AND FUELS - ANALYSIS AND MONITORING

5. The Company shall prepare and implement, prior to the firing of Alternative Fuel in the Cement Kiln, a Raw Feed and Fuels Analysis and Monitoring Program to record the properties and quantities of the Raw Feed and Fuels used in the Cement Kiln during the Demonstration Project. The Raw Materials and Fuels Analysis and Monitoring Program shall specify as a minimum:

   (1) sampling methodology and frequency and chemical analysis of raw feed, Conventional Fuel and Alternative Fuel directed to the Cement Kiln;

   (2) hourly feed rate of the raw feed, Conventional Fuel and Alternative Fuel in the Cement Kiln during the Demonstration Project.

MONITORING

CONTINUOUS EMISSIONS MONITORING

6. The Company shall ensure that the existing Continuous Emissions Monitoring Systems, are fully operational during the Demonstration Project, to continuously monitor the following parameters in the exhaust gas stream of the Cement Kiln Exhaust Stack:

   (a) Nitrogen Oxides;
   (b) Sulphur Dioxide;
   (c) Opacity;

   The Continuous Emissions Monitoring Systems for Nitrogen Oxides and Sulphur Dioxide shall comply with the requirements of O. Reg. 194/05, EPA – "Industry Emissions – Nitrogen Oxides and Sulphur Dioxide" . The Continuous Emissions Monitoring System for Opacity shall comply with the requirements outlined in Schedule "D" attached to this Approval.

AMBIENT AIR QUALITY MONITORING

7. The Company shall conduct an Ambient Air Quality Monitoring Program during the Demonstration Project to determine the concentrations of the Test Contaminants listed in Schedule "B1", in accordance with the Ambient Air Quality Monitoring Program. Upwind and downwind sampling locations will be selected based on historical meteorological data and air dispersion modelling of the Cement Kiln stack. Ambient air sampling and monitoring will occur during both Baseline Conditions and with the use of Alternative Fuel in the Cement Kiln.

SOURCE TESTING

8. The Company shall conduct, a Source Testing Program, following the Source Testing Procedures listed in Schedule "C", during the Demonstration Project, to determine the rate of emission of the Test Contaminants listed in Schedule "B2" from the Cement Kiln Exhaust Stack. The Source Testing Program shall be designed to include both the Baseline Conditions and with the use of Alternative Fuel in the Cement Kiln.

REPORTING

9. The Company shall prepare and submit to the Director and District Manager, no later than six (6) months after the completion of the Demonstration Project, a Demonstration Project Summary Report. The Demonstration Project Summary Report shall include, as a minimum, but not limited to:

   (1) a summary of emission data and analysis obtained through the Source Testing Program, the Ambient Air Quality Monitoring Program and the Continuous Emissions Monitoring Program, conducted during the Demonstration Project, prepared in accordance with the requirements of the Reporting Procedures described in Schedule "C" attached to this Approval, as applicable;

   (2) a summary of all comments received by the Company during the Demonstration Project that pertain to the Demonstration Project from the public, the Ministry, or any other party.

10. The Company shall ensure that the above mentioned Demonstration Project Summary Report is made available and easily accessible for review by the public at the Facility and via an internet website, immediately after the document is submitted to the Ministry.

RECORD KEEPING REQUIREMENTS

11. The Company shall retain, for a minimum of five (5) years from the date of their creation and provide to the Ministry, upon request, in a timely manner, all reports, records and information required by this Approval and shall include but not be limited to:

   (1) time, date and duration of the Demonstration Project;

   (2) all records and reports produced from the Raw Feed and Fuels Analysis and Monitoring Program, the Source Testing Program, the Ambient Air Quality Monitoring Program and the Continuous Emissions Monitoring Program required under this Approval;

   (3) all records and reports produced as part of the assessments of emissions and impacts from the operation of the Cement Kiln, as a result of the utilization of Alternative Fuel for the Cement Kiln;

   (4) all records related to all environmental complaints made by the public during the Demonstration Project;

   (5) a copy of the Demonstration Project Summary Report required under Condition 8.

NOTIFICATION

12. The Company shall notify the District Manager, in writing, at least fifteen (15) business days prior to commencement of the Demonstration Project.

COMPLAINTS RESPONSE PROCEDURE

13. If at any time, the Company receives any environmental complaints from the public regarding the operation of the Facility during the Demonstration Project, the Company shall respond to these complaints according to the following procedure:

    (1) The District Manager shall be notified forthwith upon receipt of any complaint;

    (2) Each complaint shall be recorded and numbered, and shall include the following information, as a minimum:

        (a) nature of the complaint;
        (b) weather conditions and wind direction at the time of the complaint;
        (c) name and address of the complainant (if provided); and
        (d) time and date of the complaint;

    (3) Appropriate steps shall be taken forthwith to determine all possible causes of the complaint and to eliminate the cause of the complaint. A written reply shall be provided to the complainant, if known and if requested by the complainant, within 3 business days of receipt of the complaint by the Company.

SCHEDULE "A1"

OPERATIONAL LIMITS

Parameter	Limits	Comments
Quantity of Alternative Fuel	No more than 30% substitution (based on heating value).	Measured continuously.
Raw Material Feed Rate	>250 tonnes/hour	Measured continuously.
Temperature	>1000°C at a residence time of more than 6 seconds in the Kiln >850°C at a residence time of more than 3 seconds in the calciner	Measured by a continuous monitor Calculated as a rolling 1-hour arithmetic average measured by a continuous monitoring system that provides data at least once every 1 minute
Residual oxygen	>1% Residual oxygen at the backend of the kiln. >3% Residual oxygen at the calciner down comer duct.	Measured by a continuous monitor and calculated by volume on a dry basis in the undiluted gases leaving the Kiln. Calculated as a rolling 1-hour arithmetic average measured by a continuous monitoring system that provides data at least once every 1 minute
Pressure Control	Kiln must be operated under negative pressure at all times during the Demonstration Project.	Measured at the top of the preheater towers by continuous monitor.
Start-Up, Shut-down and Upset Operating conditions	No Alternative Fuel to be used.	-

SCHEDULE "A2"

PERFORMANCE OBJECTIVES

Parameter	Emission Limit	Comments
Particulate Matter (PM)	50 mg/Rm^3	calculated as the arithmetic average of three stack tests conducted in accordance with standard methods
Dioxins and Furans	80 pg/Rm^3 as ITEQ	calculated as the arithmetic average of three stack tests conducted in accordance with standard methods
Hydrochloric Acid (HCl)	27 mg/Rm^3	calculated as the arithmetic average of three stack tests conducted in accordance with standard methods
Cadmium	7 ug/Rm3	calculated as the arithmetic average of three stack tests conducted in accordance with standard methods
Lead	60 ug/Rm3	calculated as the arithmetic average of three stack tests conducted in accordance with standard methods
Mercury	20 ug/Rm3	calculated as the arithmetic average of three stack tests conducted in accordance with standard methods

Notes:

R - Reference flue gas conditions, defined as follows:

- Temperature 25 °C
- Pressure 101.3 kPa
- Oxygen content 11%
- Water content nil (dry conditions)

mg/Rm3 - milligrams per cubic metre of gas at Reference conditions.
ug/Rm3 - micrograms per cubic metre of gas at Reference conditions.
pg/Rm3 - picograms per cubic metre of gas at Reference conditions.
I-TEQ - a toxicity equivalent concentration calculated using the toxic equivalency factors (I-TEFs) derived for each dioxin and furan congener by comparing its toxicity to the toxicity of 2,3,7,8 tetrachloro dibenzo-p-dioxin, recommended by the North Atlantic Treaty Organizations's Committee on Challenges to Modern Society [NATO/CCMS] in 1989 and adopted by Canada in 1990.

SCHEDULE "B1"
TEST CONTAMINANTS
Ambient Air Quality Monitoring Program

Metals	Polycyclic Aromatic Hydrocarbons	Dioxins and Furans	Volatile Organic Compounds
Antimony (Sb)	1-Methyl naphthalene	2,3,7,8-Tetrachlorodibenzo-p-dioxin	acetone
Aluminum (Al)	1-Methyl phenanthrene	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	benzene
Arsenic (As)	2-Chloronaphthalene	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	chloromethane
Barium (Ba)	2-Methylanthracene	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	bromomethane
Beryllium (Be)	2-Methylnaphthalene	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	chloroethane
Boron (B)	3-Methylcholanthrene	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	1,1- dichloroethylene (vinyl chloride)
Cadmium (Cd)	7,12-Dimethylbenzo(a)anthracene	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	methylene chloride
Chromium (Cr)	9,10-Dimethylanthracene		1,1- dichloroethane
Cobalt (Co)	Acenaphthene	2,3,7,8-Tetrachlorodibenzofuran	trans - 1,2 -dichloroethylene
Copper (Cu)	Acenaphthylene	2,3,4,7,8-Pentachlorodibenzofuran	cis - 1,2 -dichloroethylene
Lead (Pb)	Anthracene	1,2,3,7,8-Pentachlorodibenzofuran	chloroform
Manganese (Mn)	Benzo(a)anthracene	1,2,3,4,7,8-Hexachlorodibenzofuran	1,2 -dichloroethane
Mercury (Hg)	Benzo(b)fluoranthene	1,2,3,6,7,8-Hexachlorodibenzofuran	2- butanone
Molybdenum (Mo)	Benzo(k)fluoranthene	1,2,3,7,8,9-Hexachlorodibenzofuran	1,1,1 –trichloroethane
Nickel (Ni)	Benzo(a)fluorene	2,3,4,6,7,8-Hexachlorodibenzofuran	carbon tetrachloride
Phosphorus (P)	Benzo(b)fluorene	1,2,3,4,6,7,8-Heptachlorodibenzofuran	1,1,2- trichloroethane
Potassium (K)	Benzo(g,h,i)perylene	1,2,3,4,7,8,9-Heptachlorodibenzofuran	1,2- dichloropropane
Selenium (Se)	Benzo(a)pyrene	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	trichloroethylene
Silver (Ag)	Benzo(e)pyrene		bromodichloromethane
Strontium (Sr)	Chrysene		dibromochloromethane
Thalium (Tl)	Coronene		toluene
Tin (Sn)	Dibenzo(a,e)pyrene		tetrachloroethylene
Titanium (Ti)	Dibenzo(a,h)anthracene		chlorobenzene
Vanadium (V)	Fluoranthene		ethylbenzene
Zinc (Z)	Fluorene		m/p xylene
Calcium Oxide (CaO)	Indeno(1,2,3-cd)pyrene		o - xylene
Iron Oxide (FeO)	Naphthalene		styrene
	Perylene		bromoform
	Phenanthrene		1,1,1,2 -tetrachloroethane
	Pyrene		1,1,2,2 -tetrachloroethane
	Tetralin		cumene (isopropyl benzene)
	Dibenzo(a,c)anthracene + Picene (sum of 2)		1,2-dibromoethane (ethylene dibromide)

SCHEDULE "B2"

TEST CONTAMINANTS

Source Testing Program

Nitrogen Oxides
Sulphur Dioxide
Carbon Monoxide
Carbon Dioxide
Total Suspended Particulate Matter
PM 10
PM 2.5
Hydrogen Chloride
Ammonia
Calcium Oxide
Ferric Oxide

Metals		Volatile Organic Matter
Cd	Cadmium	acetone
Be	Beryllium	benzene
Pb	Lead	bromodichloromethane
Mo	Molybdenum	bromoform
Cr	Chromium	bromomethane
Ni	Nickel	butanone, 2 -
V	Vanadium	carbon tetrachloride
Al	Aluminum	chlorobenzene
Ti	Titanium	chloroethane
Mg	Magnesium	chloroform
B	Boron	chloromethane
Ba	Barium	cumene (isopropyl benzene)
P	Phosphorus	dibromochloromethane
K	Potassium	dichloroethane, 1,1 -
Hg	Mercury	dichloroethane, 1,2 -
As	Arsenic	dichloroethene, trans - 1,2 -
Zn	Zinc	dichloroethene, 1,1 – (vinyl chloride)
Sb	Antimony	dichloroethylene, cis - 1,2 -
Mn	Manganese	dichloropropane, 1,2 -
Co	Cobalt	ethylbenzene
Se	Selenium	ethylene dibromide (1,2-dibromoethane)
Cu	Copper	methylene chloride
Ag	Silver	styrene
Sn	Tin	tetrachloroethane, 1,1,1,2 -
Sr	Strontium	tetrachloroethane, 1,1,2,2 -
Tl	Thalium	tetrachloroethene
		toluene
		trichloroethane, 1,1,1 –
		trichloroethane, 1,1,2 -
		trichloroethene (trichloroethylene, 1,1,2 -)
		xylenes

Dioxins, Furans and Dioxin-like PCBs

2,3,7,8-Tetrachlorodibenzo-p-dioxin [2,3,7,8-TCDD]
1,2,3,7,8-Pentachlorodibenzo-p-dioxin [1,2,3,7,8-PeCDD]
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin [1,2,3,4,7,8-HxCDD]
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin [1,2,3,6,7,8-HxCDD]
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin [1,2,3,7,8,9-HxCDD]
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin [1,2,3,4,6,7,8-HpCDD]
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin [1,2,3,4,6,7,8,9-OCDD]
2,3,7,8-Tetrachlorodibenzofuran [2,3,7,8-TCDF]
2,3,4,7,8-Pentachlorodibenzofuran [2,3,4,7,8-PeCDF]
1,2,3,7,8-Pentachlorodibenzofuran [1,2,3,7,8-PeCDF]
1,2,3,4,7,8-Hexachlorodibenzofuran [1,2,3,4,7,8-HxCDF]
1,2,3,6,7,8-Hexachlorodibenzofuran [1,2,3,6,7,8-HxCDF]
1,2,3,7,8,9-Hexachlorodibenzofuran [1,2,3,7,8,9-HxCDF]
2,3,4,6,7,8-Hexachlorodibenzofuran [2,3,4,6,7,8-HxCDF]
1,2,3,4,6,7,8-Heptachlorodibenzofuran [1,2,3,4,6,7,8-HpCDF]
1,2,3,4,7,8,9-Heptachlorodibenzofuran [1,2,3,4,7,8,9-HpCDF]
1,2,3,4,6,7,8,9-Octachlorodibenzofuran [1,2,3,4,6,7,8,9-OCDF]

3,3',4,4'-Tetrachlorobiphenyl [3,3',4,4'-tetraCB (PCB 77)]
3,4,4',5- Tetrachlorobiphenyl [3,4,4',5-tetraCB (PCB 81)]
3,3',4,4',5- Pentachlorobiphenyl (PCB 126) [3,3',4,4',5-pentaCB (PCB 126)]
3,3',4,4',5,5'- Hexachlorobiphenyl [3,3',4,4',5,5'-hexaCB (PCB 169)]
2,3,3',4,4'- Pentachlorobiphenyl [2,3,3',4,4'-pentaCB (PCB 105)]
2,3,4,4',5- Pentachlorobiphenyl [2,3,4,4',5-pentaCB (PCB 114)]
2,3',4,4',5- Pentachlorobiphenyl [2,3',4,4',5-pentaCB (PCB 118)]
2',3,4,4',5- Pentachlorobiphenyl [2',3,4,4',5-pentaCB (PCB 123)]
2,3,3',4,4',5- Hexachlorobiphenyl [2,3,3',4,4',5-hexaCB (PCB 156)]
2,3,3',4,4',5'- Hexachlorobiphenyl [2,3,3',4,4',5'-hexaCB (PCB 157)]
2,3',4,4',5,5'- Hexachlorobiphenyl [2,3',4,4',5,5'-hexaCB (PCB 167)]
2,3,3',4,4',5,5'- Heptachlorobiphenyl [2,3,3',4,4',5,5'-heptaCB (PCB 189)]

Polycyclic Organic Matter:
Acenaphthylene
Acenaphthene
Anthracene
Benzo(a)anthracene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(a)fluorene
Benzo(b)fluorene
Benzo(ghi)perylene
Benzo(a)pyrene
Benzo(e)pyrene
2-Chloronaphthalene
Chrysene
Coronene
Dibenzo(a,c)anthracene
9,10-Dimethylanthracene
7,12-Dimethylbenzo(a)anthracene

Fluoranthene
Fluorene
Indeno(1,2,3-cd)pyrene
2-Methylanthracene
3-Methylcholanthrene
1-Methylnaphthalene
2-Methylnaphthalene
1-Methylphenanthrene
9-Methylphenanthrene
Naphthalene
Perylene
Phenanthrene
Picene
Pyrene
Tetralin
Triphenylene

Chlorinated Organics

total dichlorobenzenes
total trichlorobenzenes (1,3,5-; 1,2,3-; 1,2,4-)
total tetrachlorobenzenes (1,2,4,5-; 1,2,3,5-)
pentachlorobenzene
hexachlorobenzene
total dichlorophenols (2,3-; 2,4-; and 2,6-)
total trichlorophenols (2,3,4-; 2,4,5-; 2,4,6-; 3,4,5-)
total tetrachlorophenols (2,3,4,6-;2,3,5,6)
total pentachlorophenols

SCHEDULE "C"

MONITORING AND REPORTING PROCEDURES

A. SOURCE TESTING PROCEDURES

1. The Company shall submit, to the Manager a test protocol including the Pre-Test Information required by the Source Testing Code, at least thirty (30) days prior to the scheduled dates of the Source Testing Program.

2. The Company shall finalize the test protocol in consultation with the Manager.

3. The Company shall not commence the Source Testing until the Manager has accepted the test protocol.

4. The Company shall notify the District Manager and the Manager in writing of the location, date and time of any impending Source Testing required by this Approval, at least fifteen (15) days prior to the Source Testing.

5. The Director may not accept the results of the Source Testing Program if:
   (1) the Source Testing Code or the requirements of the Manager were not followed; or
   (2) the Company did not notify the District Manager and the Manager of the Source Testing; or
   (3) the Company failed to provide a complete report on the Source Testing.

B. REPORTING PROCEDURES

SOURCE TESTING PROGRAM

1. The Company shall submit a report on the Source Testing Program to the District Manager and the Manager not later than six (6) months after completing the Source Testing Program. The report shall be in the format described in the Source Testing Code, and shall also include, but not be limited to:

   (1) an executive summary;
   (2) records of operating conditions; including a summary of the results of the Raw Feed and Fuels Analysis and Monitoring Program as required by Condition 4 of this Approval;
   (3) all records produced by the continuous monitoring systems during the Demonstration Project;
   (4) assessment of compliance with the Cement Kiln Exhaust Stack Operating Limits for the parameters listed in Schedule "A1" attached to this Approval;
   (5) the results of source testing and air dispersion calculations in accordance with regulation 419/05, indicating the maximum concentration of the Test Contaminants emitted from the Cement Kiln Stack at the Point of Impingement and an assessment of compliance with Regulation 419/05 Schedule 3 standards; and
   (6) a description and explanation of any statistically significant changes in emissions from the Cement Kiln Exhaust Stack and Point of Impingement Concentrations of the Test Contaminants, if any, resulting from the use of Alternative Fuel, relative to the Baseline Conditions.

AMBIENT AIR MONITORING PROGRAM

2. The Company shall submit a report on the results of the Ambient Air Quality Monitoring Program, to the District Manager not later than six (6) months after completing the Demonstration Project . The report shall include, but not be limited to:

   (1) an executive summary;
   (2) records of operating conditions; including a summary of the results of the Raw Feed and Fuels Analysis and Monitoring Program;
   (3) sample dates, frequency and duration;
   (4) information on the exact location of samplers, including the analysis to site them. A map must be included, clearly showing where each monitoring station is located.
   (5) a description of the specifications of the monitors used in the Ambient Air Quality Monitoring Program;
   (6) a description of the specifications of the meteorological stations used to monitor and record meteorological conditions and analysis of wind direction
   (7) results of the Ambient Air Monitoring Program for the Test Contaminants listed in Schedule B1;
   (8) a description and explanation of any statistically significant changes in ambient air concentrations of the Test Contaminants, if any, resulting from the use of Alternative Fuel, relative to the Baseline Conditions.

SCHEDULE "D"

Continuous Monitoring System Requirements

PARAMETER: **Opacity**

INSTALLATION:
The Continuous Opacity Monitor shall be installed at an accessible location where the measurements are representative of the actual opacity of the gases leaving the *Cement Kiln Exhaust Stack* and shall meet the following design and installation specifications:

PARAMETERS	SPECIFICATION
1. Wavelength at Peak Spectral Response (nanometres, nm):	500 - 600
2. Wavelength at Mean Spectral Response (nm):	500 - 600
3. Detector Angle of View:	≤ 5 degrees
4. Angle of Projection:	≤ 5 degrees
5. Range (percent of opacity):	0 -100

PERFORMANCE:
The Continuous Opacity Monitor shall meet the following minimum performance specifications for the following parameters.

PARAMETERS	SPECIFICATION
1. Span Value (percent opacity):	80 percent
2. Calibration Error:	≤ 3 percent opacity
3. Attenuator Calibration:	≤ 2 percent opacity
4. Response Time (95 percent response to a step change):	≤ 10 seconds
5. Schedule for Zero and Calibration Checks:	daily minimum
6. Procedure for Zero and Calibration Checks:	all system components checked
7. Zero Calibration Drift (24-hours):	≤ 2 percent opacity
8. Span Calibration Drift (24-hours):	≤ 2 percent opacity
9. Conditioning Test Period:	≥ 168 hours without corrective maintenance
10. Operational Test Period:	≥ 168 hours without corrective maintenance

CALIBRATION:
The monitor shall be calibrated, to ensure that it meets the drift limits specified above, during the Demonstration Project. The results of all calibrations shall be recorded at the time of calibration.

DATA RECORDER:
The data recorder must be capable of registering continuously the measurement of the monitor with an accuracy of 0.5 percent of a full scale reading or better and with a time resolution of 30 seconds or better.

RELIABILITY:
The monitor shall be operated and maintained so that accurate data is obtained during a minimum of 90 percent of the time during the Demonstration Project.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition No. 1 is included to outline the minimum performance requirements considered necessary to prevent an adverse effect resulting from the utilization of any Alternative Fuel for the Cement Kiln during the Demonstration Project.

2. Condition Nos. 2, 3 and 4 are included to require the Company to operate and maintain the Facility in accordance with the terms and conditions of this Approval.

3. Condition Nos. 5, 6, 7 and 8 are included to require the Company to gather accurate information so that the environmental impact and subsequent compliance with the EPA, Regulation 419/05 and this Approval can be verified.

4. Condition Nos. 9, 10, 11 and 12 are included to require the Company to retain records of information gathered during the Demonstration Project and to provide easy public access to information related to the Demonstration Project, so that the environmental impact and subsequent compliance with the EPA, the regulations and this Approval can be verified.

5. Condition No. 13 is included to require the Company to respond to any environmental complaints related to the Demonstration Project, according to procedures that include methods for preventing recurrence of similar incidents.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of
Part II.1 of the Environmental Protection Act
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 5th day of November, 2014

THIS APPROVAL WAS MAILED
ON November 7, 2014
H.A.
(Signed)

Rudolf Wan

Rudolf Wan, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

QN/
c: District Manager, MOE York-Durham
Bridget Mills, P.Eng., BCX Environmental Consulting. ✓

APPENDIX B

APPENDIX A

1.2 Facility Description

The Bowmanville plant is located on Waverley Road south Highway 401, at the south west corner of South Service Road and Waverley Road in Bowmanville, Ontario. The original wet process cement manufacturing facility, which was established in the early 1970s, was located at grade adjacent to an onsite limestone quarry. In the early 1990s the cement manufacturing process was changed from wet to dry. At this time the wet process kiln was decommissioned and replaced with a dry pre-calciner kiln system (a rotary kiln system which includes a multi-stage cyclonic pre-heater tower including a pre-calciner unit to promote further calcination during preheating). Other equipment common to both the wet and dry process (*i.e.*, cement finishing, product storage and load-out) remains in operation to date with minor upgrades.

The original limestone quarry, which now extends east along the north portion of the site, continues to supply crushed limestone to the cement plant. At the southern tip of St. Marys' property, a separate entity, Cargo Dockers, operates a raw material and fuel cargo dock, which supplies gypsum and solid fuel to the cement plant.

The St. Marys Technical Centre and Hutton Transport (the trucking division of St. Marys Cement) maintain offices and a truck depot at the north east corner of the site.

The cement plant operates 12 months per year typically on a 24 hours per day, 7 days per week schedule, with a maximum production capacity of 6,500 tonnes of clinker per day.

The fundamental process of cement manufacturing consists of combining materials bearing calcium oxide, silica, alumina and iron oxide at high temperatures to produce cement clinker. The clinker is subsequently ground with finishing materials such as gypsum, limestone, clay and slag to produce cement. A detailed description of the cement process equipment and operations, as well as supporting maintenance activities are presented in Section 2.0.

The zoning maps (Municipality of Clarington By-Law 84-63, Schedule 1 and Schedule 3) provided in Appendix B indicates that there are no residences or sensitive receptors within

1,000m of the major sources of noise (i.e., cement plant, main storage piles and quarry). Letters of incorporation for St Marys Cement Inc. (Canada) are included in Appendix C.

2.0 PROCESS DESCRIPTION

Operations at the St. Marys site can be separated into the following aspects:

- limestone extraction;
- construction grade limestone processing;
- cement manufacturing;
- maintenance;
- secondary docking operations;
- comfort heating and domestic hot water; and
- emergency diesel generators.

2.1 Limestone Extraction

Limestone is currently extracted from the quarry via blasting of one of four limestone benches. Blasting operations currently occur in the south and southeast section the quarry at the closest point that the quarrying activities can be to the property line. Up to 150 holes can be drilled along the blast face covering a maximum horizontal surface area of approximately 2,000 m^2 (i.e., 100,000 tonnes/blast). Blasting typically occurs between one to three times per week.

Two front-end loaders transfer the fragmented stone from the blast face onto four mining tractors. The fragmented stone is transported either to the cement plant's underground primary crusher which feeds the primary surge pile (two bank rock storage pile) for the cement plant or to the construction grade limestone stock pile.

2.2 Construction Grade Limestone Processing

The composition of limestone extracted from the quarry varies with depth and location. A portion of the extracted limestone is sorted, processed and transferred offsite by CBM Aggregates, a division of St. Marys Cement Inc.

CBM Aggregates operates one diesel-fuelled front-end loader and two crushers in the construction grade limestone processing area. This area is currently located west of the cement plant in close proximity to the facility's western property line. As a part of Bowmanville's dust management plan, this processing area is to be re-located into the quarry.

Construction grade limestone from the construction grade storage pile in the quarry will be transferred by CBM's front-end loader into CBM's primary crusher. From this point material will be conveyed to CBM's secondary crusher and screen and to the product stockpiles by a series of conveyors. The limestone will be crushed into six types of material (i.e., HL6, 19mm clear run, 19mm crusher run, 50mm clear run, 50mm crusher run and screenings).

The construction grade limestone processing area will typically operate 12 hours per day, 7 days per week, with a maximum processing capacity of 300 tonnes/hour.

2.3 Cement Manufacturing Operations

A simplified process flow diagram is attached – see Figure 1.

The cement manufacturing process can be divided into five primary stages;

- raw materials and kiln fuel acquisition and handling (including quarry operations);
- raw meal (kiln feed) preparation;
- pyroprocessing (calcination and clinkerization);
- processing of clinker; and
- product load-out.

2.1.1 Raw Materials and Kiln Fuel Acquisition and Handling

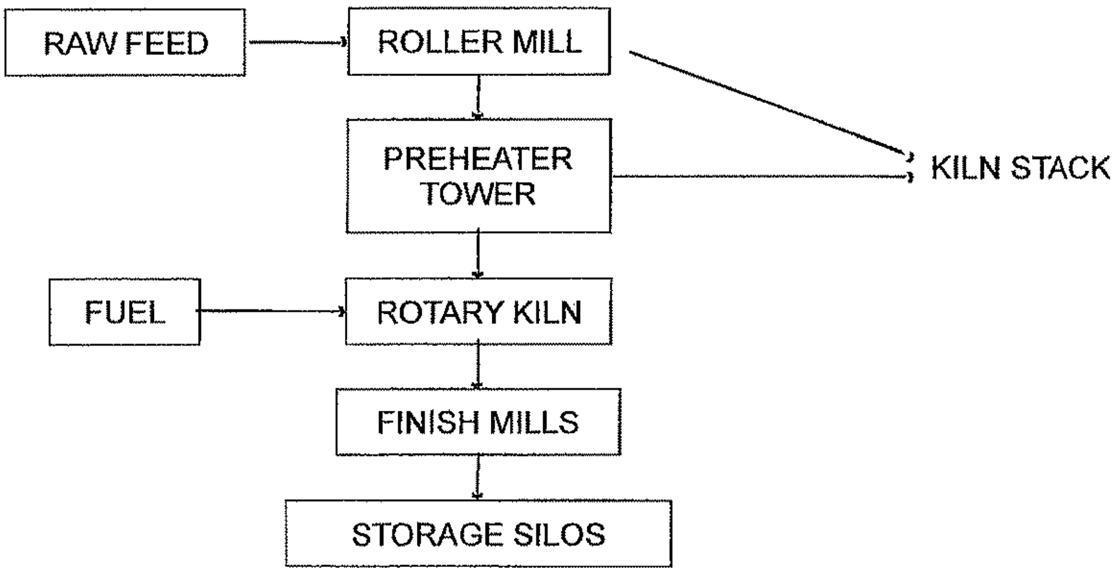
For the purposes of identifying how the various raw materials are delivered, stored and handled, to raw material categories have been defined: "low moisture" and "high moisture." Materials that are categorized as "low moisture" typically include ashes, iron bearing materials and silicas, and are stored in silos or daily use stockpiles. Materials that are defined as "high moisture" typically include limestone, gypsum and clay,[2] and are stored in various stockpiles (which may include temporary, main and daily use stockpiles).

2.1.1.1 Acquisition and Handling of Raw Materials with Low Water Content

"Low moisture" raw materials (i.e., ash, iron and silica) can be stored in either silos or as daily-use stockpiles. Materials to be stored in silos are pneumatically transferred directly from the raw material delivery tankers into their corresponding storage silos. The storage silo capacities and locations are presented in Appendix D.

Materials to be stored in daily-use stockpiles are delivered in trucks and stored outside in small stockpiles. A diesel-fuelled front-end loader transfers these materials into a partially enclosed hopper. An elevator system transfers the material into storage silos (same ones as if the material were pneumatically delivered).

[2] The Bowmanville plant does not currently use clay as an alternative silica source. However, since the facility wishes to use clay material in the future this material has been included in the ESDM. Clay materials are approved for use at the Bowmanville plant's sister facility in St. Marys, Ontario.



PROCESS FLOW DIAGRAM - ENTIRE PLANT

St Mary's Cement Plant,
Bowmanville, ON

ST. MARY'S CEMENT INC.

File No.: 2764-01.01
Date: April 2006
Dwg No.: 2764-01.01-fig1
Drawn by: M.W.

FIGURE
1

2.1.1.2 Acquisition and Handling of Raw Materials with High Moisture Content

Coarse limestone is delivered directly to the cement plant from the quarry, located on site, on a shrouded conveyor and deposited onto the two bank rock storage pile. An underground conveyor located below the stockpile transfers the coarse limestone to an enclosed secondary crusher and screen. Processed limestone is then fed by another enclosed conveyor to one of:

a) three raw meal limestone storage silos, located south of the cement plant; or

b) three additive limestone silos located near the finish mills.

The location of these silos and their capacity are presented in Appendix D.

Gypsum is delivered by ship and stored in piles located at the shoreline. Diesel-fuelled front-end loaders transfer the material onto one of four Volvo trucks, which then transport the gypsum to the main storage piles located south of the quarry. As required by the cement plant production, the gypsum is re-loaded onto one International truck which moves between the main stockpile and the cement plant. At the plant gypsum is deposited into the gypsum underground hopper through a partially enclosed surface grate (grizzly). The gypsum is transferred by an enclosed conveyor to the gypsum crusher, where it is reduced in size prior to being pneumatically transferred to the gypsum storage silo (as described in Appendix D).

Clay will be delivered by truck and stored in small stockpiles located south of the raw material silos. A front-end loader will transfer the clay into the same partially enclosed hopper and associated elevator system that services the "low moisture" content raw materials.

2.1.1.3 Acquisition and Handling of Kiln Fuel

The pre-calciner kiln system is fired with solid fuel (i.e., a mixture of coal and pet-coke).

Pet-coke and coal are delivered to the facility by ship and deposited into temporary stockpiles. Diesel-fuelled front-end loaders transfer the fuel onto one of four Volvo trucks, which then transport the fuel to the main storage piles located south of the quarry. As required by the cement plant production the fuel is re-loaded onto one International truck (same truck as for gypsum) which moves between the main stockpiles and the cement plant. At the plant fuel is deposited into the fuel underground hopper through a partially enclosed surface grate (grizzly).

Petroleum coke may also be delivered by rear-dump trucks, which transfer the material directly into the fuel underground hopper.

Fuel from the underground fuel hopper travels along an enclosed conveyor up into the fuel storage silo. The fuel is extracted from the silo and fed to the fuel milling system. Petroleum coke is proportionally mixed with coal (0–100%) in the fuel milling system. Milled fuel is temporarily stored in a bin prior to being fed to the kiln burner (at a maximum rate of 13 tonnes/hr) and calciner burner (at a maximum rate of 18 tonnes/hr).

2.1.1.4 Raw Meal (Kiln Feed) Preparation

In this stage of the process, limestone, silica and iron are proportionately fed from the raw material storage silos via an enclosed conveyor belt system to a raw mill. Raw meal formulations can contain up to 95% limestone, 0.5% silica, 2.7% iron. In the raw mill, the raw materials are mixed together, ground to a uniform particle size and dried. The raw mill uses the hot exhaust gases from the pre-heater tower to dry the raw meal. The dried raw meal is stored in Kiln Feed Silo, (see Appendix D).

Dried raw meal is fed, via air slides and bucket elevators, up to a dual string pre-heater tower. Each pre-heater string consists of a series of five cyclones. As the raw meal progressively passes through a pre-heater string and its cyclones, it encounters hotter and hotter gases from the kiln. Prior to being directed into the kiln, a portion of the pre-heated material is fed into a pre-calciner where the moisture content is effectively reduced to zero, and the material temperature is raised to 840 °C.

2.1.2 Pyroprocessing Stage

In the kiln, the raw meal temperature is gradually raised to over 1,500°C. The chemical reactions and physical processes transform the raw meal into clinker (grey, glass-hard, spherically shaped nodules).

With the exception of a bypass stream, flue gases from the kiln pass through the pre-heater strings and raw mill to the main baghouse and are exhausted to the atmosphere via the main kiln stack adjacent to the pre-heater tower.

In an effort to reduce nitrogen oxides (NOx) and sulphur oxides (SOx) emissions to comply with Regulation 194/05, a Selective Non-Catalytic NOx Reduction (SNCR) ammonia solution injection system and hydrated limestone injection system was installed after the bypass piping (in the lower calciner and upper riser) and before the pre-heater strings. While reducing NOx emissions, the SNCR system may release unreacted ammonia into the atmosphere.. Hydrated lime associated with the hydrated limestone injection system is captured in the main kiln baghouse.

The final stage of pyroprocessing is clinkerization. This stage involves cooling of the molten product into solid spheres (termed clinker) by passing ambient air across the clinker and into the kiln for use as combustion air. The Bowmanville plant uses a reciprocating grate cooler, which achieves a lower clinker discharge temperature by passing an additional quantity of air through the clinker. This additional air passes through the Cooler Baghouse prior to being exhausted to the atmosphere through the cooler stack located south of the finish mills.

2.1.3 Processing of Clinker to Cement

The final step in the process involves a sequence of blending and grinding operations that transform clinker into finished cement.

Clinker exits the kiln at a maximum rate of 260 tonnes/hr and an average temperature of 350°C onto an enclosed conveyor system, which feeds one of four clinker storage silos.

Cooled clinker from the clinker storage silos is conveyed to the roller press where it is pre-ground. Pre-ground clinker is then transferred into of three cement finish mill feed silos.

Cement finishing is accomplished in three individual ball mill grinding systems located north of the kiln. Clinker, limestone and gypsum are milled together to produce cement. Finish mills #1 and #3 exhaust though a common stack. Finish mill #2 exhausts though a dedicated stack.

2.1.4 Product Load-Out

Following cement finishing, cement is transferred on an enclosed conveyor belt into product storage silos located north of the kiln and at the shoreline (as described in Appendix D). Product stored in silos located north of the kiln can be dispatched from the product silos in bulk, via tanker trucks or railroad tankers. Product stored in the silos at the dock are shipped by boat.

In addition to finished cement product, the plant also ships unfinished clinker to its sister plant in Detroit. The unfinished clinker uses the same enclosed conveyor system as the finished cement product.

2.4 Maintenance

There is one maintenance shop located east of the kiln and west of the quarry. The maintenance shop stores spare parts and equipment. The shop performs welding activities, which typically take place outside.

The automotive repair garage is located west of the primary crusher. This garage performs scheduled maintenance on the trucks (oil changes, tire changes, etc.). The shop can maintain only one vehicle at a time.

2.5 Secondary Docking Operations

Cargo Dockers maintains the main gypsum and fuel storage area located south of the plant, near the shoreline. The company owns five trucks (4 Volvo trucks and 1 International tuck) and three diesel-fuelled front-end loaders. The mobile equipment works simultaneously to transfer gypsum and fuel delivered by ship to the main stockpiles located south of the quarry. The International truck then transfers the gypsum and fuel to the plant.

In addition to handling materials for the cement plant, Cargo Dockers also maintains a separate storage area for raw materials (primarily coal, petcoke and salt) delivered by ship for a number of other companies. These stockpiles are covered by tarps except for the coal storage piles.

2.6 Comfort Heating and Domestic Hot Water

All comfort heat, with the exception of the quarry garage, is provided by electrical units. At the quarry garage comfort heat is provided by propane-fired radiant heaters with a total capacity of 0.1 scf/hr.

Domestic hot water in the lunchroom, service room and Hutton Transport are provided by No. 2 oil-fired boilers having a total capacity of 34.65 U.S. gal/hr.

Equipment specifications are presented in Appendix E.

2.7 Emergency Diesel Generators

There are three emergency diesel-fired generators. One CAT, Model D355 Series E, 450 HP, diesel-fired generator is located east of the kiln in a separate building. The generator is used to provide electricity to the facility during main power failures.

One John Deere, Model CD 6359D705575, 200 HP, diesel-fired generator located south of the plant in the pump house. This generator is used to provide electricity to the equipment located near the shoreline during main power failures.

Finally, one CAT, Model 81Z09016, 749 HP, diesel-fired generator is located west of the kiln in a separate building. The generator provides electricity to rotate the kiln during main power failures.

Monthly tests and maintenance are performed.

2.8 QA/QC Fume Hoods

The facility operates eight quality assurance/quality control (QA/QC) fume hoods located in the QA/QC laboratory in the main building east of the kiln. The fume hoods exhaust through one exhaust stack located on the roof of the building. Five tests are typically performed:

1. Material Composition – these tests involve collecting samples of clinker, flyash, slag, limestone and sand, and then leaching metals and sulphur with a suitable acid (either nitric, hydrochloric, hydrofluoric, boric, sulphuric or acetic acid) to ensure proper chemical composition of the end product. Chemicals used in material composition tests are stored in closed containers in storage cabinets that also vent through the fume hood stacks.

2. Crushing – A small crusher (up to 1kg capacity) is used under a fume hood to create crushed material for further testing.

3. Sieve Analysis – these tests are performed on sand, flyash and slag. The materials placed in the sieves. Ambient air is drawn down through the sieves, filtered and then vented through the fume hood exhaust.

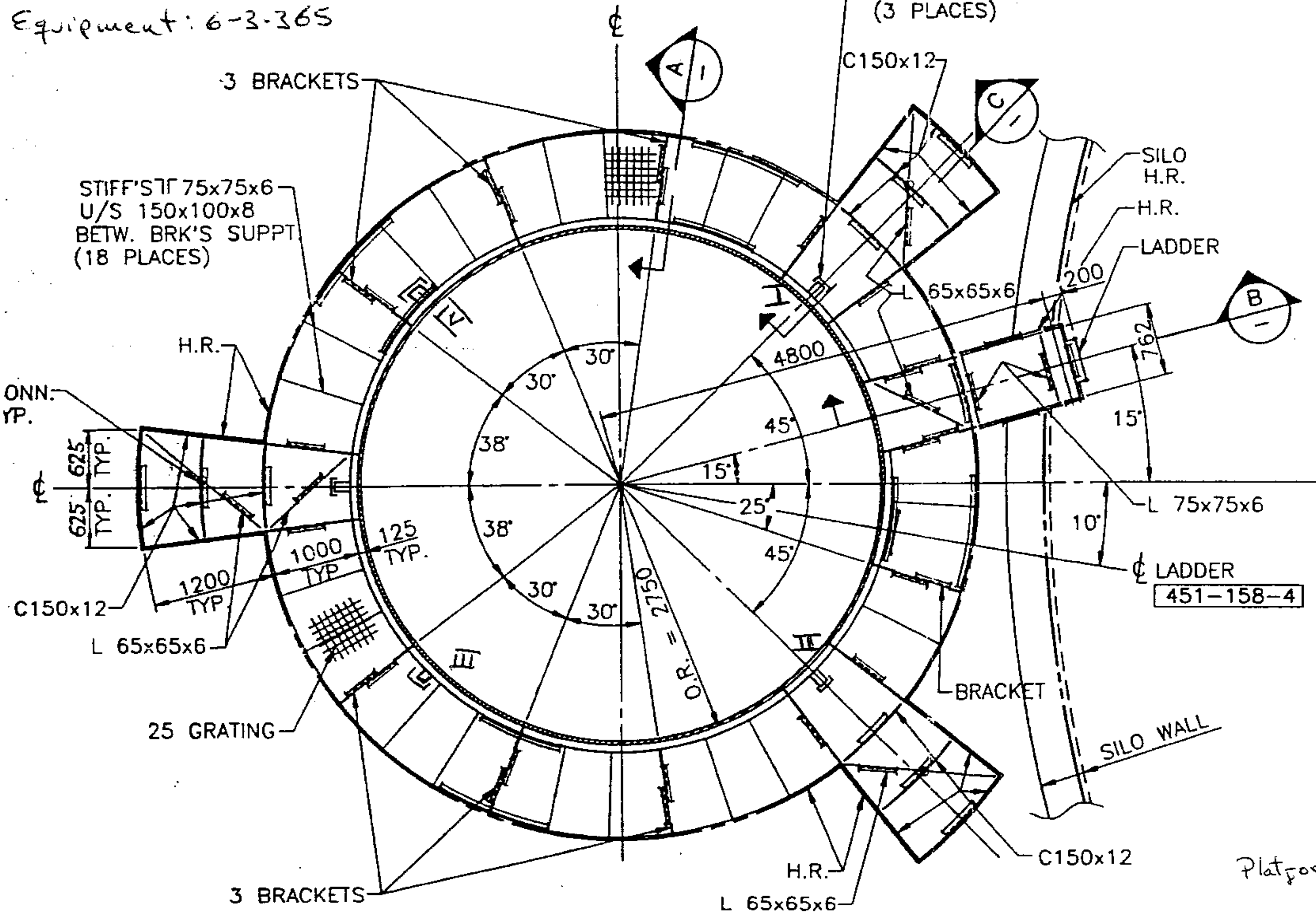
4. Fusion – Cement fusion tests are conducted to evaluate the bond strength of the cured cement. The test uses a small propane heater and small quantities of flux and cement; and

5. Moisture – Small electric drying ovens are used for moisture testing.

Drawing
6-3-2168
1707158
Equipment: 6-3-365

Old Sample Ports
(3) - 4" DIA. THREADED PIPE NIPPLES c/w PIPE CAP (3 PLACES) @ ℄ EL.169.190
(3) -- 2" EYBOLTS WELDED TO SHELL @ ℄ EL.170.700 (3 PLACES)

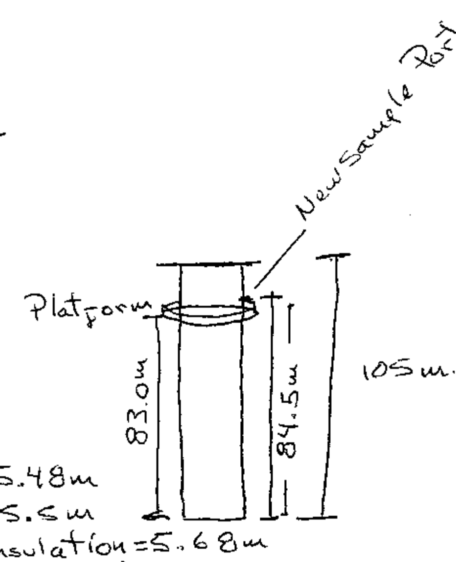
New sample Por
(4) 6" DIA Threaded Pipe
located at 90°
EL. 169.5
Locations: I, II, III, I



451-158-1

PLAN @ EL.168.023 T/GRT'G

SCALE 1:50



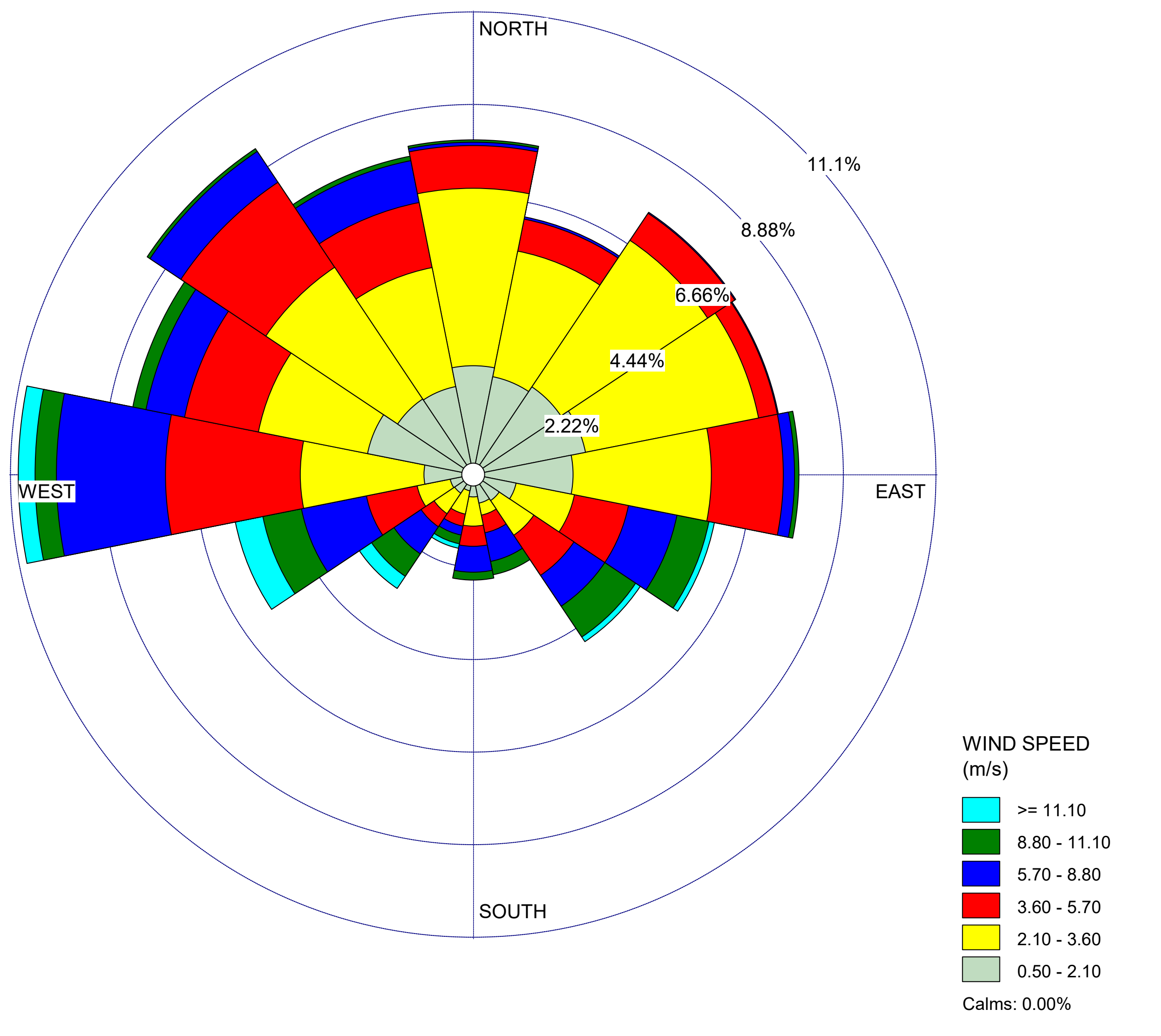
ID = 5.48m
OD = 5.5m
OD + Insulation = 5.68m
Main stack

APPENDIX A

WIND ROSE PLOT:

SMC Bowmanville Plant Site-Specific Meteorological Data (2004 -2008)
October All Day

DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS:
AERMET Version 16216

DATA PERIOD:
Start Date: 2004-10-01 - 00:00
End Date: 2008-10-31 - 23:59

CALM WINDS:
0.00%

TOTAL COUNT:
3720 hrs.

BCX ENVIRONMENTAL CONSULTING

AVG. WIND SPEED:
3.59 m/s

DATE:
2018-08-22

PROJECT NO.:
1003-01.42

WRPLOT View - Lakes Environmental Software


Hwy of Heroes
401
Ambient Station #1
Ambient Station #2
Ambient Station #3
Plant Met Station
Kiln Stack
Dock Met Statiom

Ministry of the Environment, Conservation and Parks
Technical Assessment and Standards Development Branch
40 St. Clair Avenue West
7th Floor
Toronto ON M4V 1M2
Phone: 416.327.5519
Fax: 416.327.2936

Ministère de l'Environnement, de la Protection de la nature et des Parcs
Direction des évaluations techniques et de l'élaboration des normes
40, avenue St. Clair Ouest
7e étage
Toronto (Ontario) M4V 1M2
Tél: 416 327.5519
Téléc: 416 327.2936

Via email: Kirk.Easto@rwdi.com

TSS File No.: CR:SA: 109690:18

2018/09/18

Kirk Easto
RWDI
600 Southgate Drive
Guelph, ON N1G 4P6

Dear Mr. Easto:

Subject: Pre-test plan review for source testing to be conducted at St. Mary's Cement Inc.

We received your pre-test plan (Project #1702401), dated August 30, 2018, prepared on behalf of St. Mary's Cement Inc. (SMC) and referring to source testing to be conducted at their facility in Bowmanville, Ontario.

Testing is a requirement under Environmental Compliance Approval No. 4614-826K9W issued November 5, 2014. The testing program will be conducted under baseline conditions and when firing alternative fuels.

Source to be Tested:

- Kiln Exhaust

Target Contaminants for the Source Testing Program:

- Total Suspended Particulate Matter (TSP)
- PM_{10} & $PM_{2.5}$
- Metals
- Semi-Volatile Organic Compounds (SVOC)
    - Dioxins, furans, dioxin-like PCBs
    - Polycyclic Organic Matter
    - Chlorinated Organics
- Hydrogen Chloride (HCl)
- Ammonia (NH_3)
- Volatile Organic Compounds (VOCs)
- Carbon Monoxide (CO)

***Reference Methods to be used*:**

Stack gas parameters	Ontario Source Testing Code (OSTC) Methods ON-1-ON-4
TSP	OSTC Method ON-5
PM_{10} & $PM_{2.5}$	US EPA Method 201A
Metals	US EPA Method 29
SVOC	Environment Canada EPS/1/RM/2
HCl & NH_3	US EPA Method 26
VOCs	US EPA SW846 Method 0030
CO	US EPA Method 10
O_2 and CO_2	US EPA Method 3A

***General Facility Description*:**

The fundamental process of cement manufacturing consists of combining materials bearing calcium oxide, silica, alumina, and iron oxide at high temperatures to produce cement clinker. The clinker is subsequently ground with finishing materials such as gypsum, limestone, clay and slag to produce cement.

The cement plant operates 12 months per year typically on 24 hours per day, seven days per week schedule with a maximum production capacity of 6,300 tonnes of clinker per day.

The proposed fuel supply during the demonstration product would be a blend of permitted fuel materials. This blend would consist of: “alternative fuel”- being 5.5 tonnes per hour of post-composting plastic polymers and woody residuals as well as 6.5 tonnes per hour of plastic polymers, paper fibres and woody residuals derived from industrial and/or post-consumer sources; as well as up to 4 tonnes per hour of “low carbon alternative fuels”.

Testing Strategy

The sampling location is considered ideal as per the OSTC.

Ferric oxide and calcium oxide will be calculated using the total calcium and iron measured in the method 29 train.

Nitrogen Oxides and Sulphur Dioxide will be monitored by the facility’s Continuous Emission Monitoring (CEM) system. The facility completes an annual Relative Accuracy Test Audit, which will be included in the final report.

***Operating Conditions during the Source Testing Program*:**

St. Mary’s will be operating as close to maximum production as possible. The normal production rate for the facility is 5,700 tonnes/day of clinker. The following will be monitored and included in the final report:

- Oxygen
- Opacity
- Nitrogen Oxides
- Sulphur Dioxide
- Hourly combined raw feed
- Hourly alternative fuels and conventional fuels firing rates in the kiln and calciner
- Hourly clinker production
- Concentration of the oxygen and carbon monoxide in the backend of the kiln and calciner down corner duct
- Temperature of the gases leaving the kiln
- Temperature of the gases leaving the calciner

The pre-test plan is approved as the proposed reference methodologies/sampling strategies are acceptable.

We have noted the sampling schedule to commence September 30, 2018. If changes to this schedule occur please notify both the MECP's York-Durham District Office and the Technology Standards Section.

Just a reminder that the source testing report is required to be submitted only in electronic format to the Technology Standards Section; and in electronic and hardcopy formats to the MECP's York-Durham District Office.

If you have any questions with regards to this assessment, I can be reached by phone at 416-325-3442 or by email at caitlyn.ruddy@ontario.ca

Sincerely,

Caitlyn Ruddy
Source Assessment Specialist
Technology Standards Section

cc: L. Urbina- St. Marys Cement (via email: luis.urbina@ycimentos.com)
K. Lendvay- York- Durham District Office (via email: Kim.Lendvay@ontario.ca)
C. Grant, G. Azocar- TASDB (via email)

File AQ-02 (St. Mary's Cement- Bowmanville)

Doc.Mgmt # 5AB090124

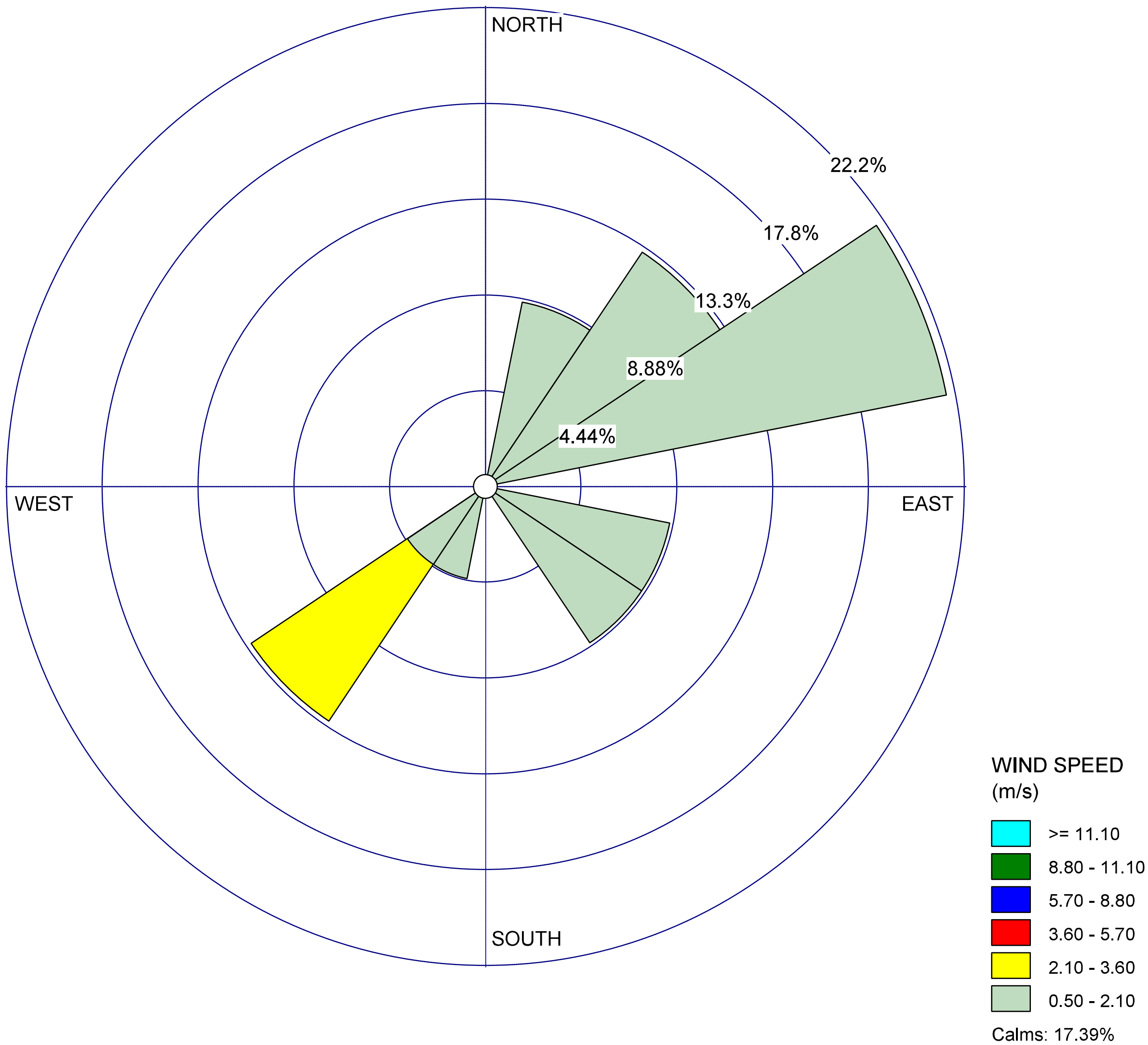
APPENDIX B

WIND ROSE PLOT:

Alt 1 - Cove
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 10/3/2018 - 00:00** **End Date: 10/4/2018 - 08:00**	COMPANY NAME: **BCX Environmental Consulting**	
		MODELER: **CS**	BCX ENVIRONMENTAL CONSULTING
	CALM WINDS: **17.39%**	TOTAL COUNT: **22 hrs.**	
	AVG. WIND SPEED: **0.88 m/s**	DATE: **3/5/2019**	PROJECT NO.: **1003-01.42**

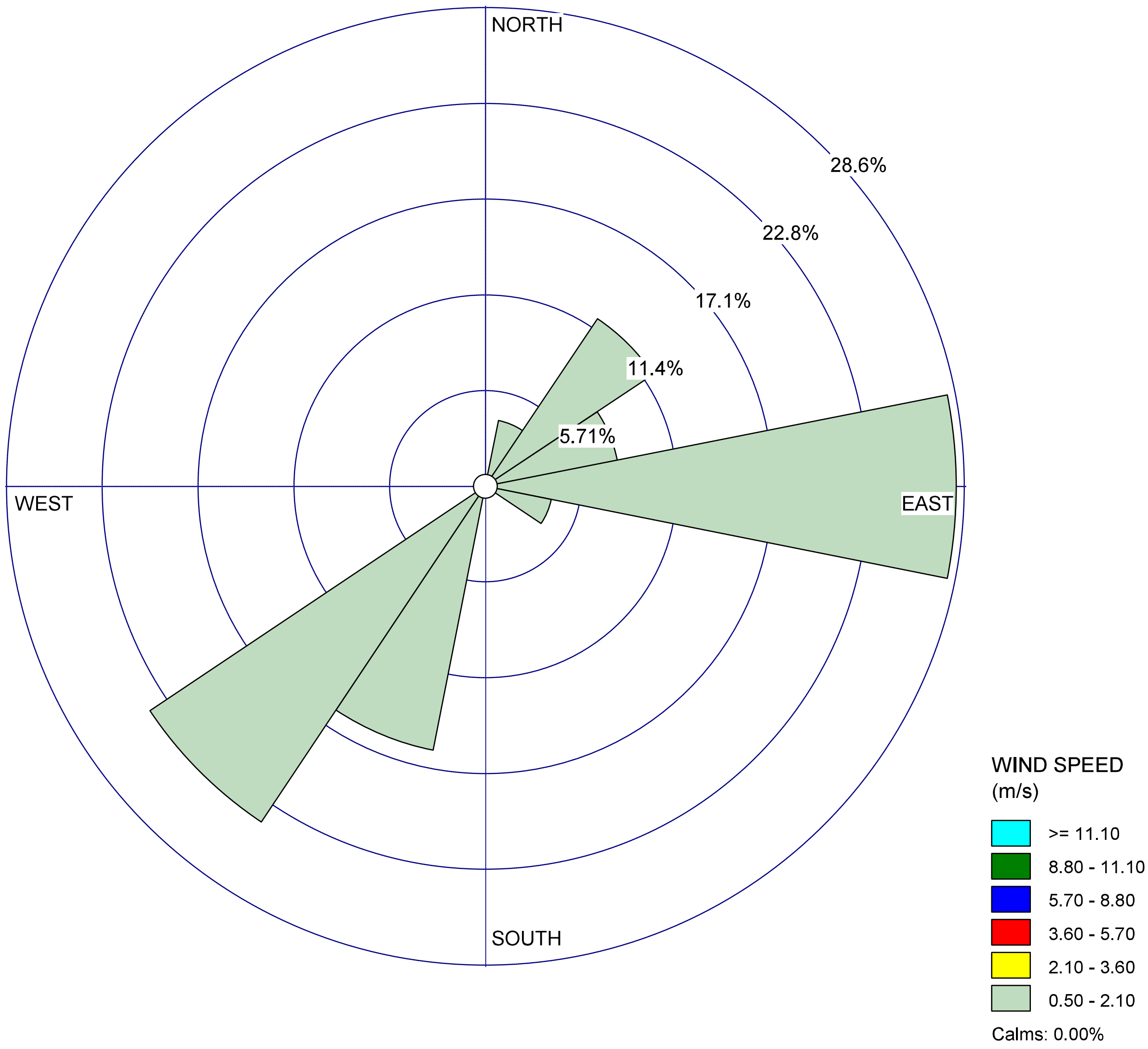
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Alt 2 Cove
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



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		MODELER: **CS**	BCX ENVIRONMENTAL CONSULTING
	CALM WINDS: **0.00%**	TOTAL COUNT: **24 hrs.**	
	AVG. WIND SPEED: **1.07 m/s**	DATE: **3/5/2019**	PROJECT NO.: **1003-01.42**

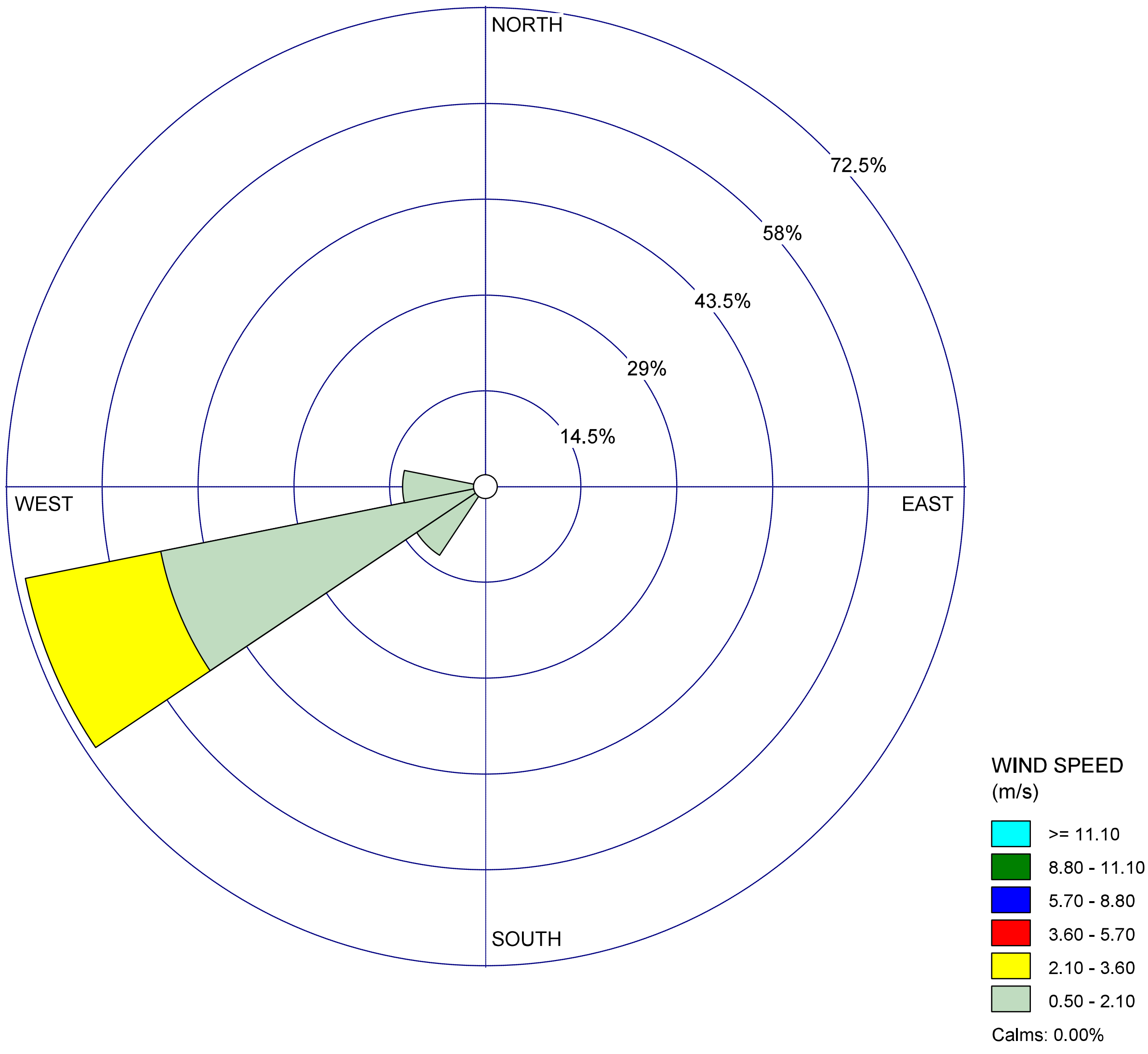
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Alt 3 Cove
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)

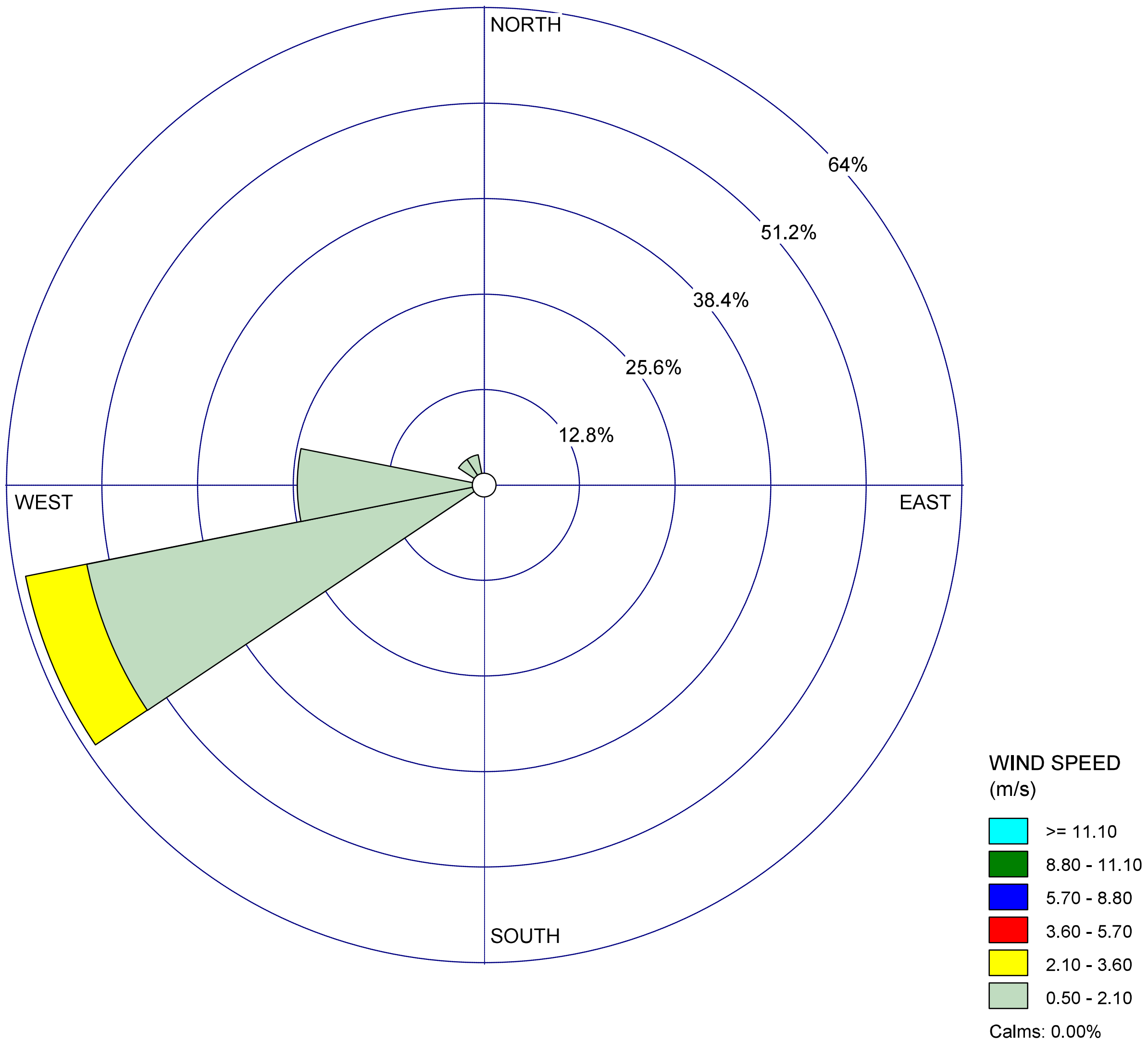


COMMENTS:	DATA PERIOD: **Start Date: 10/11/2018 - 00:00** **End Date: 10/12/2018 - 08:00**	COMPANY NAME: **BCX Environmental Consulting**
		MODELER: **CS**
	CALM WINDS: **0.00%**	TOTAL COUNT: **23 hrs.**
	AVG. WIND SPEED: **1.91 m/s**	DATE: **3/5/2019**
		PROJECT NO.: **1003-01.42**

BCX ENVIRONMENTAL CONSULTING

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:	DISPLAY:
Alt 4 Cove **Version 16216r**	**Wind Speed** **Direction (blowing from)**



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 10/12/2018 - 00:00 **End Date: 10/13/2018 - 08:00**	**BCX Environmental Consulting**	
		MODELER: **CS**	BCX ENVIRONMENTAL CONSULTING
	CALM WINDS: **0.00%**	TOTAL COUNT: **23 hrs.**	
	AVG. WIND SPEED: **1.30 m/s**	DATE: **3/5/2019**	PROJECT NO.: **1003-01.42**

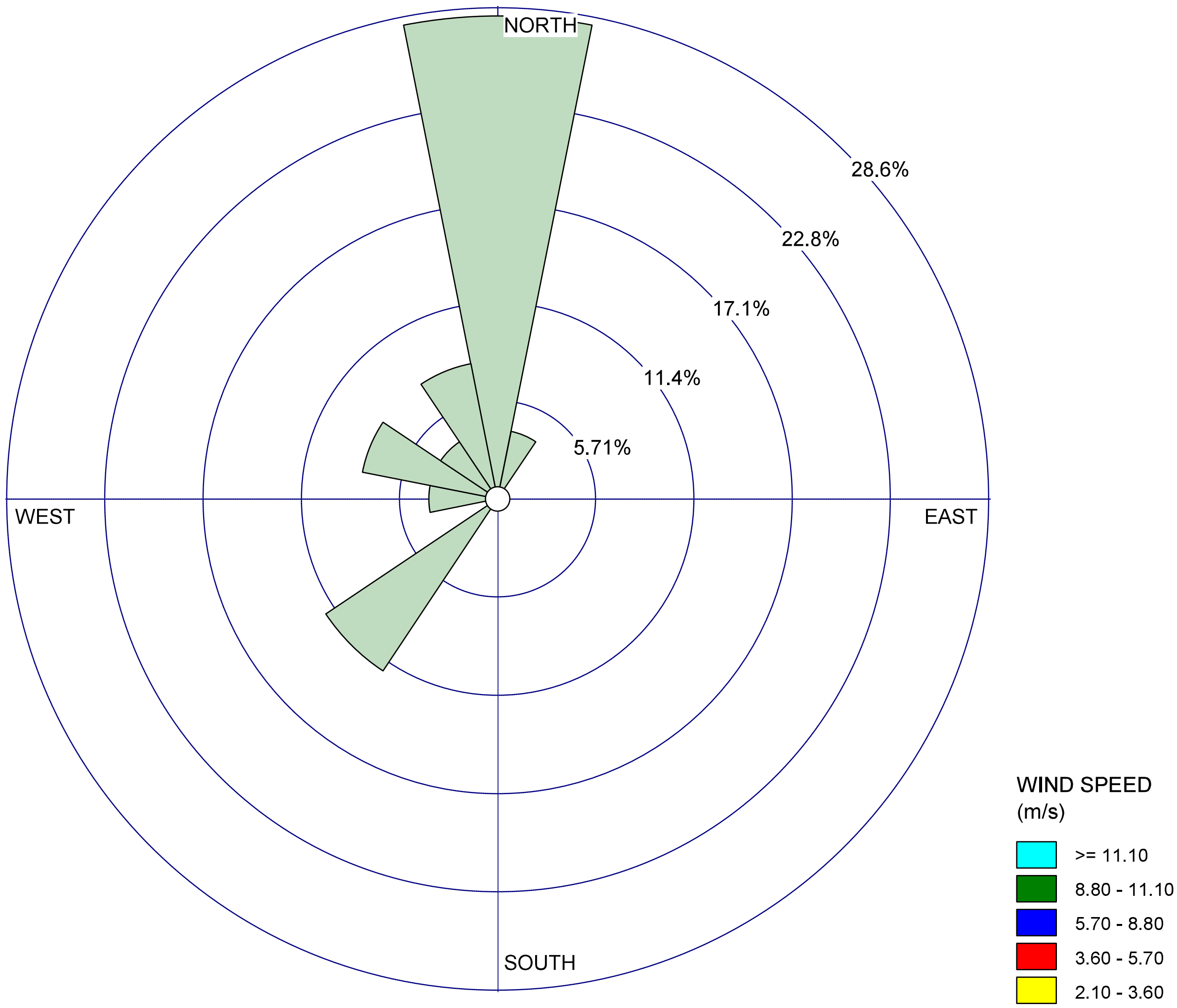
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Alt 2 (1) Cove
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
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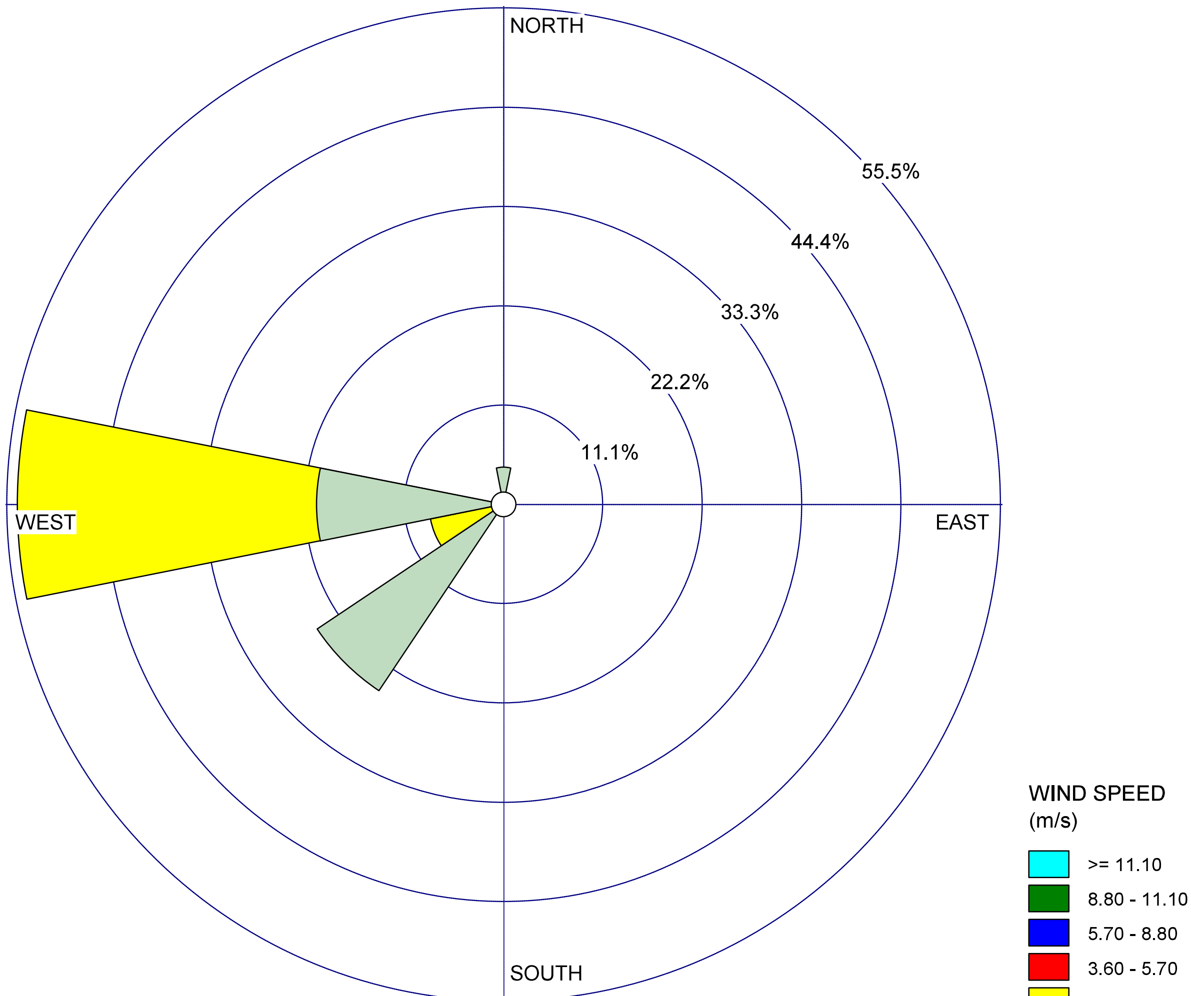
		MODELER: **CS**	BCX ENVIRONMENTAL CONSULTING
	CALM WINDS: **28.00%**	TOTAL COUNT: **24 hrs.**	
	AVG. WIND SPEED: **0.65 m/s**	DATE: **3/5/2019**	PROJECT NO.: **1003-01.42**

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:	DISPLAY:
Alt 2 (2) Cove **Version 16216r**	**Wind Speed** **Direction (blowing from)**



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
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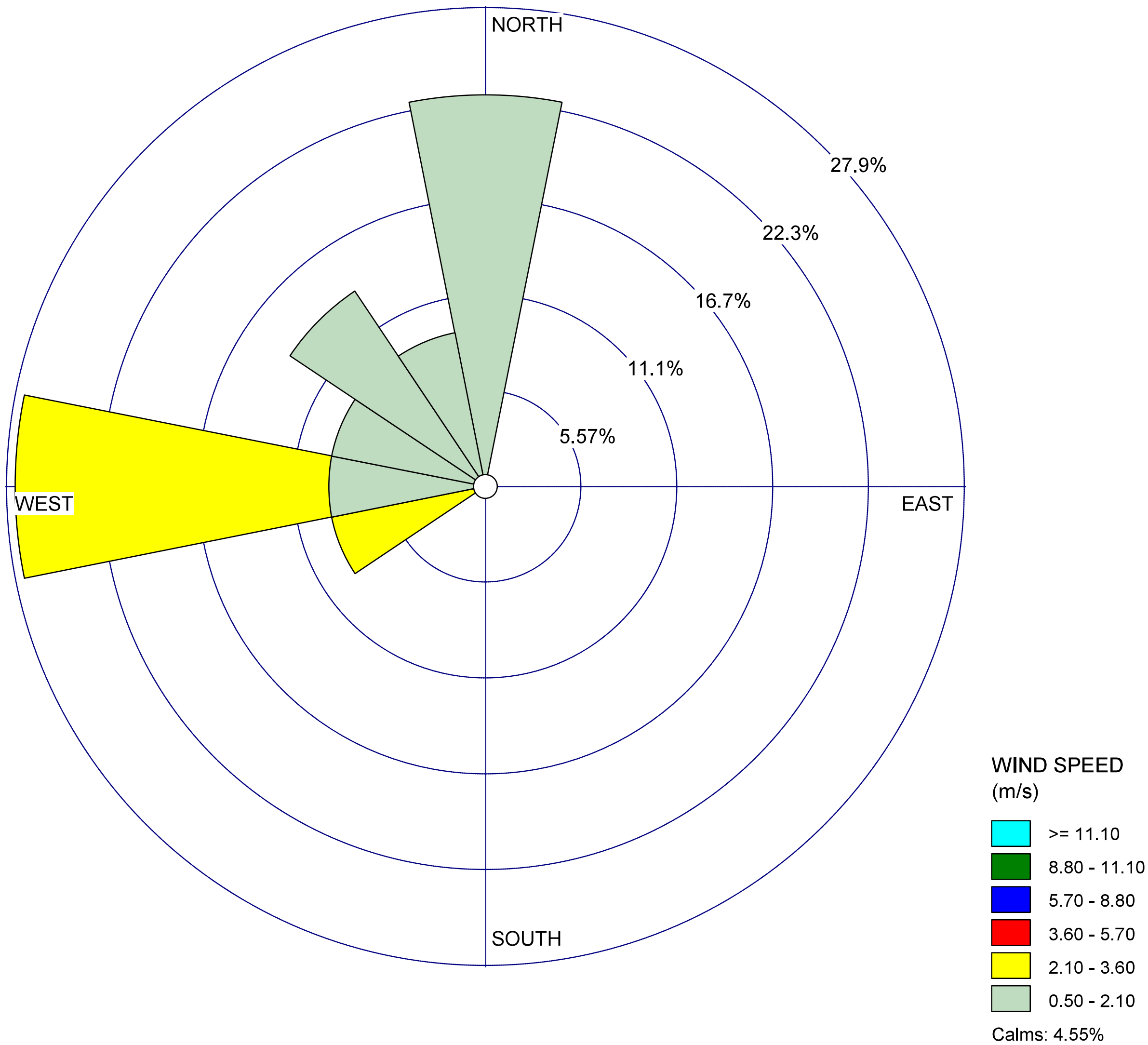
		MODELER: **CS**	BCX ENVIRONMENTAL CONSULTING
	CALM WINDS: **4.17%**	TOTAL COUNT: **23 hrs.**	
	AVG. WIND SPEED: **1.89 m/s**	DATE: **3/5/2019**	PROJECT NO.: **1003-01.42**

WIND ROSE PLOT:

Alt 2 (3) Cove
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 12/6/2018 - 00:00** **End Date: 12/7/2018 - 06:00**	COMPANY NAME: **BCX Environmental Consulting**	
		MODELER: **CS**	BCX ENVIRONMENTAL CONSULTING
	CALM WINDS: **4.55%**	TOTAL COUNT: **21 hrs.**	
	AVG. WIND SPEED: **1.43 m/s**	DATE: **3/5/2019**	PROJECT NO.: **1003-01.42**

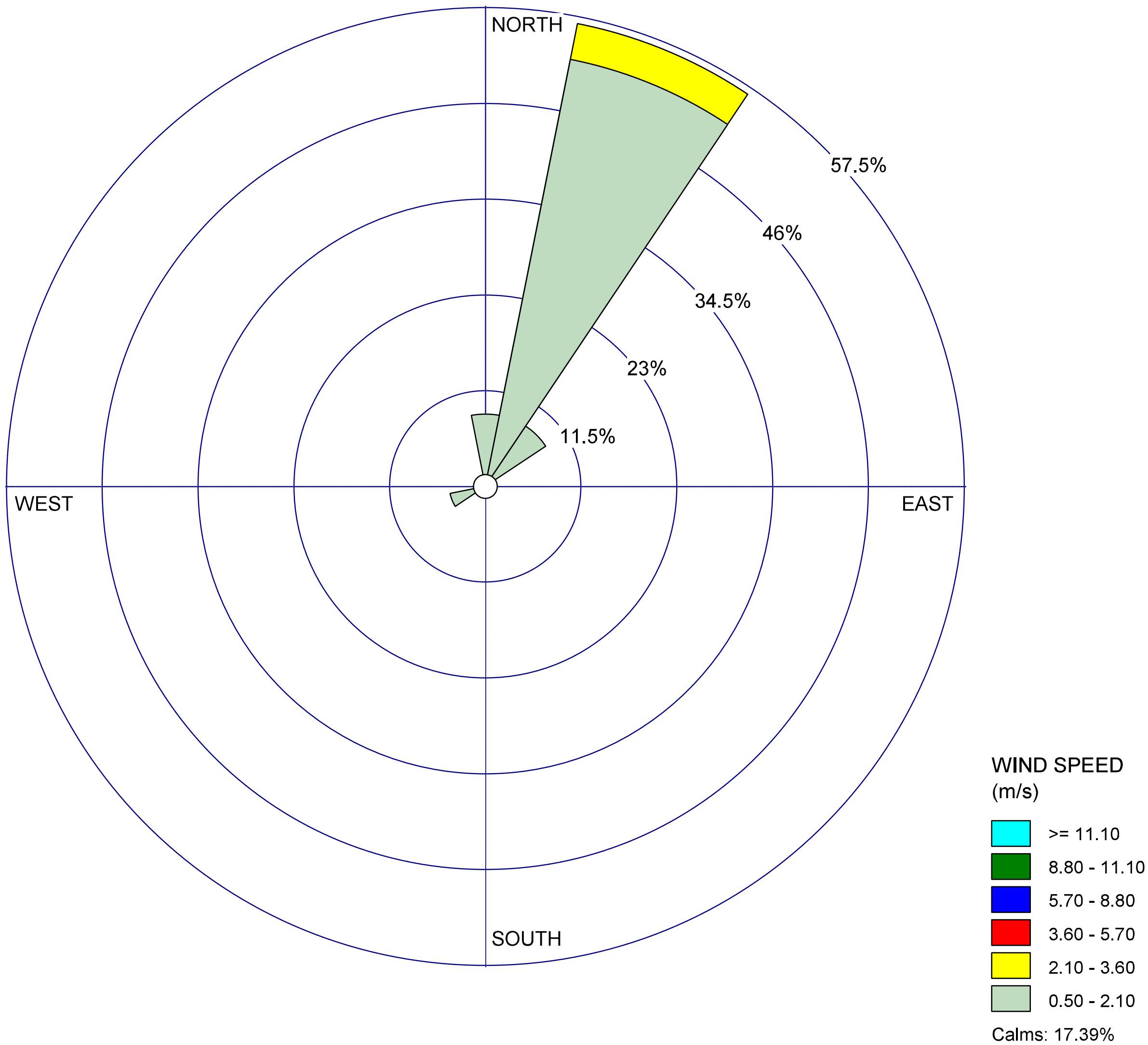
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Baseline 1 - Cove
Version 16216r

DISPLAY:

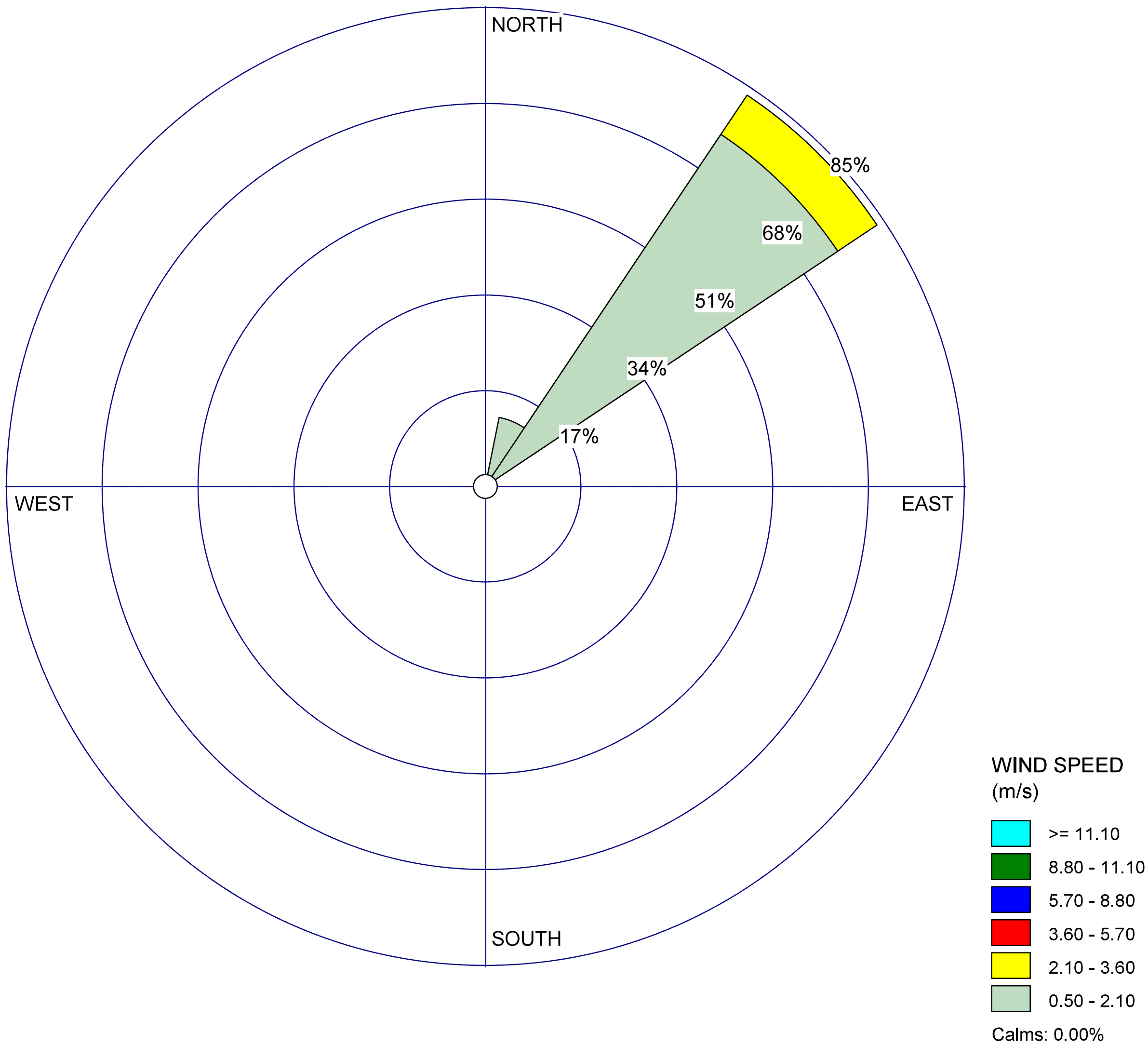
Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 9/30/2018 - 00:00 **End Date: 10/1/2018 - 08:00**	**BCX Environmental Consulting**	
		MODELER: **CS**	BCX ENVIRONMENTAL CONSULTING
	CALM WINDS: **17.39%**	TOTAL COUNT: **22 hrs.**	
	AVG. WIND SPEED: **0.97 m/s**	DATE: **3/5/2019**	PROJECT NO.: **1003-01.42**

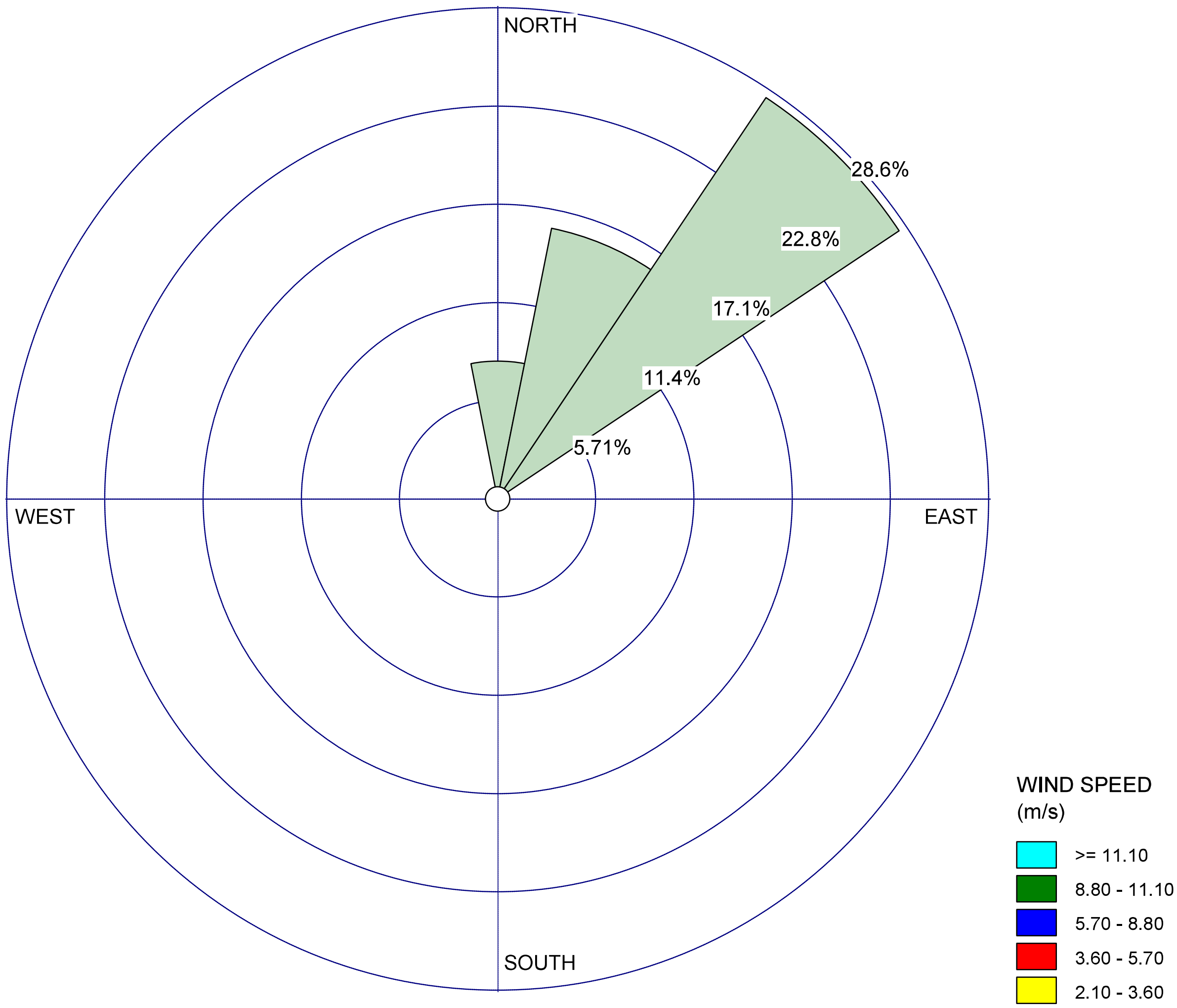
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:	DISPLAY:
Baseline 2 - Cove **Version 16216r**	**Wind Speed** **Direction (blowing from)**



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 10/1/2018 - 00:00 **End Date: 10/2/2018 - 08:00**	**BCX Environmental Consulting**	
		MODELER: **CS**	BCX ENVIRONMENTAL CONSULTING
	CALM WINDS: **0.00%**	TOTAL COUNT: **23 hrs.**	
	AVG. WIND SPEED: **1.65 m/s**	DATE: **3/5/2019**	PROJECT NO.: **1003-01.42**

WIND ROSE PLOT:	DISPLAY:
Baseline 3 - Cove **Version 16216r**	**Wind Speed** **Direction (blowing from)**



COMMENTS:	DATA PERIOD: **Start Date: 10/2/2018 - 00:00** **End Date: 10/3/2018 - 09:00**	COMPANY NAME: **BCX Environmental Consulting**	
		MODELER: **CS**	BCX ENVIRONMENTAL CONSULTING
	CALM WINDS: **44.00%**	TOTAL COUNT: **24 hrs.**	
	AVG. WIND SPEED: **0.69 m/s**	DATE: **3/5/2019**	PROJECT NO.: **1003-01.42**

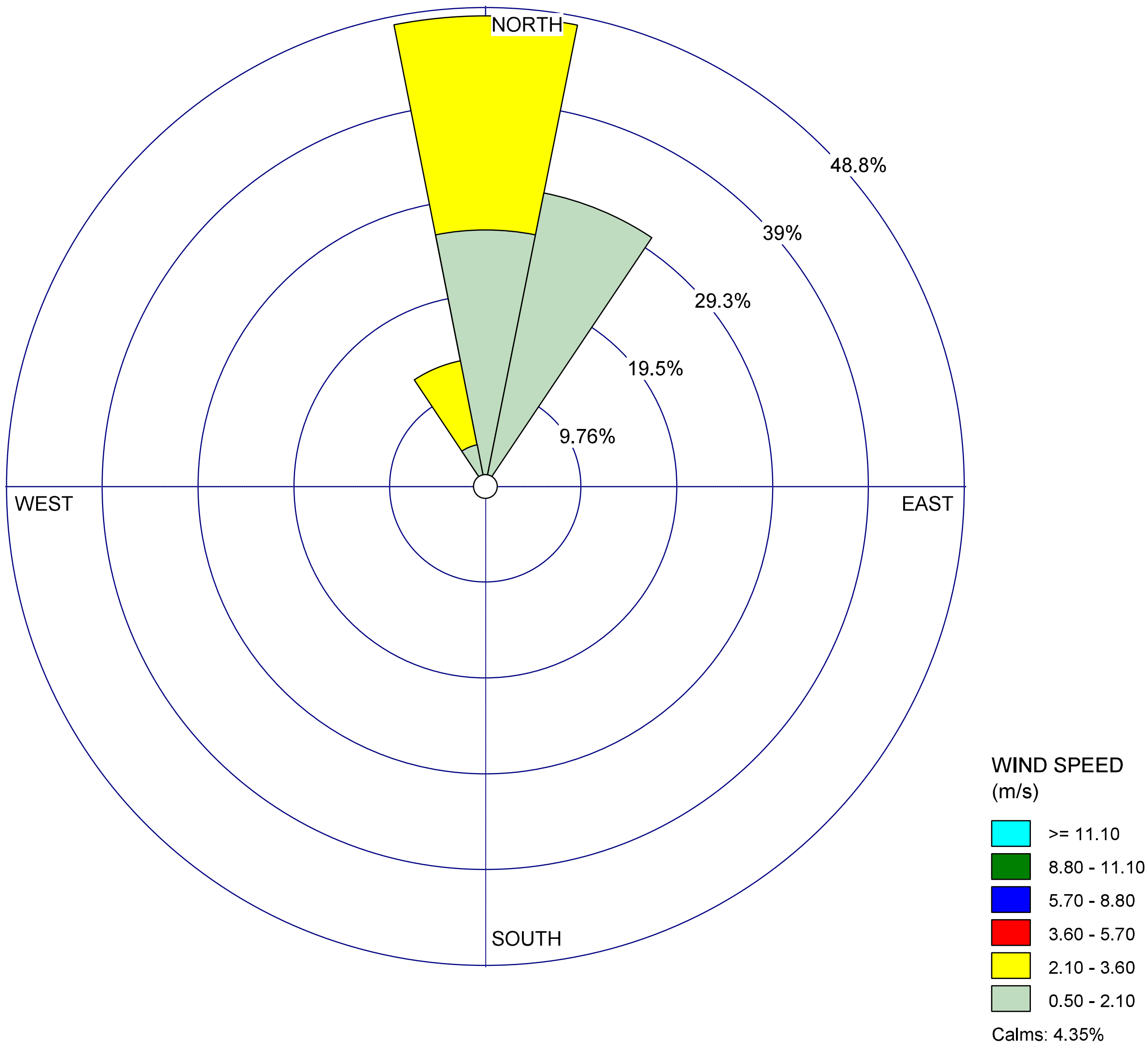
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Baseline 4 - Cove
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 10/4/2018 - 00:00** **End Date: 10/5/2018 - 07:00**	COMPANY NAME: **BCX Environmental Consulting**	
		MODELER: **CS**	BCX ENVIRONMENTAL CONSULTING
	CALM WINDS: **4.35%**	TOTAL COUNT: **22 hrs.**	
	AVG. WIND SPEED: **1.60 m/s**	DATE: **3/5/2019**	PROJECT NO.: **1003-01.42**

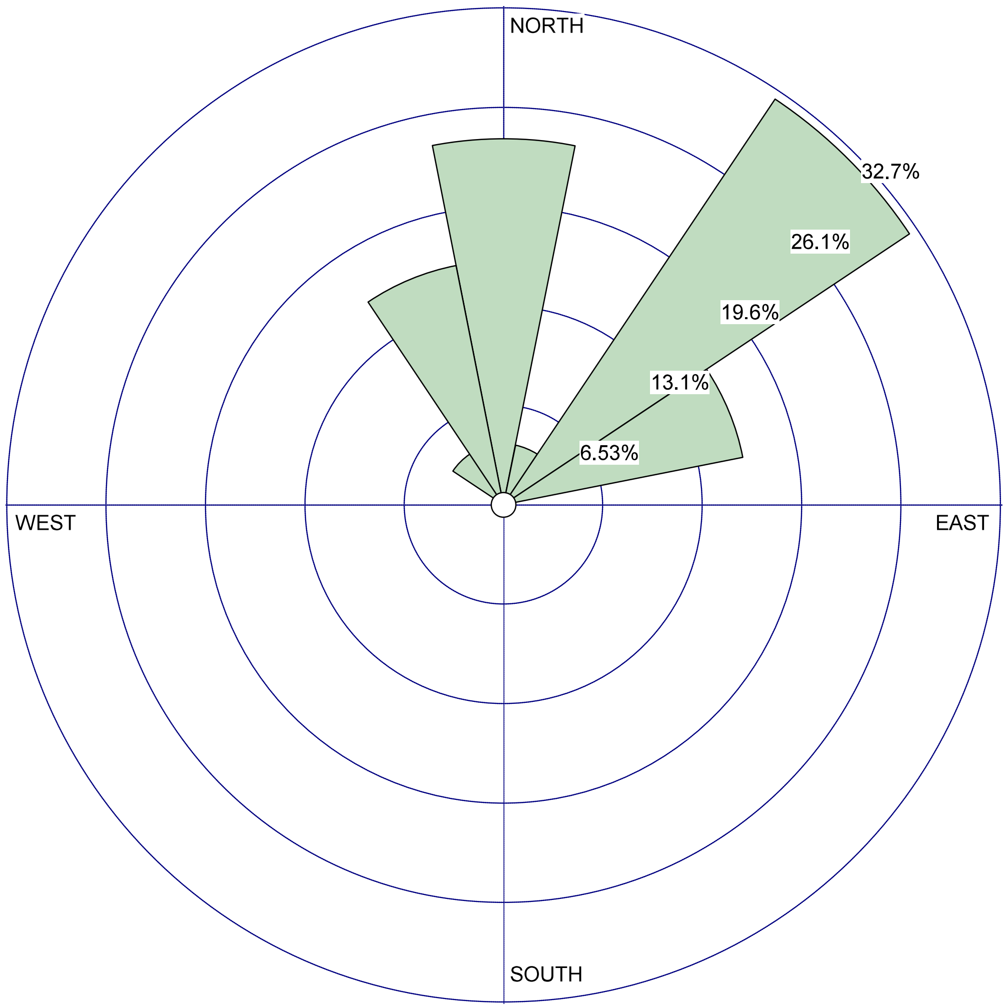
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Alt 2 (4) Cove
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



WIND SPEED
(m/s)

- >= 11.10
- 8.80 - 11.10
- 5.70 - 8.80
- 3.60 - 5.70
- 2.10 - 3.60
- 0.50 - 2.10

Calms: 0.00%

COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 12/7/2018 - 00:00 **End Date: 12/8/2018 - 07:00**	**BCX Environmental Consulting**	
		MODELER: **CS**	BCX ENVIRONMENTAL CONSULTING
	CALM WINDS: **0.00%**	TOTAL COUNT: **24 hrs.**	
	AVG. WIND SPEED: **1.24 m/s**	DATE: **3/5/2019**	PROJECT NO.: **1003-01.42**

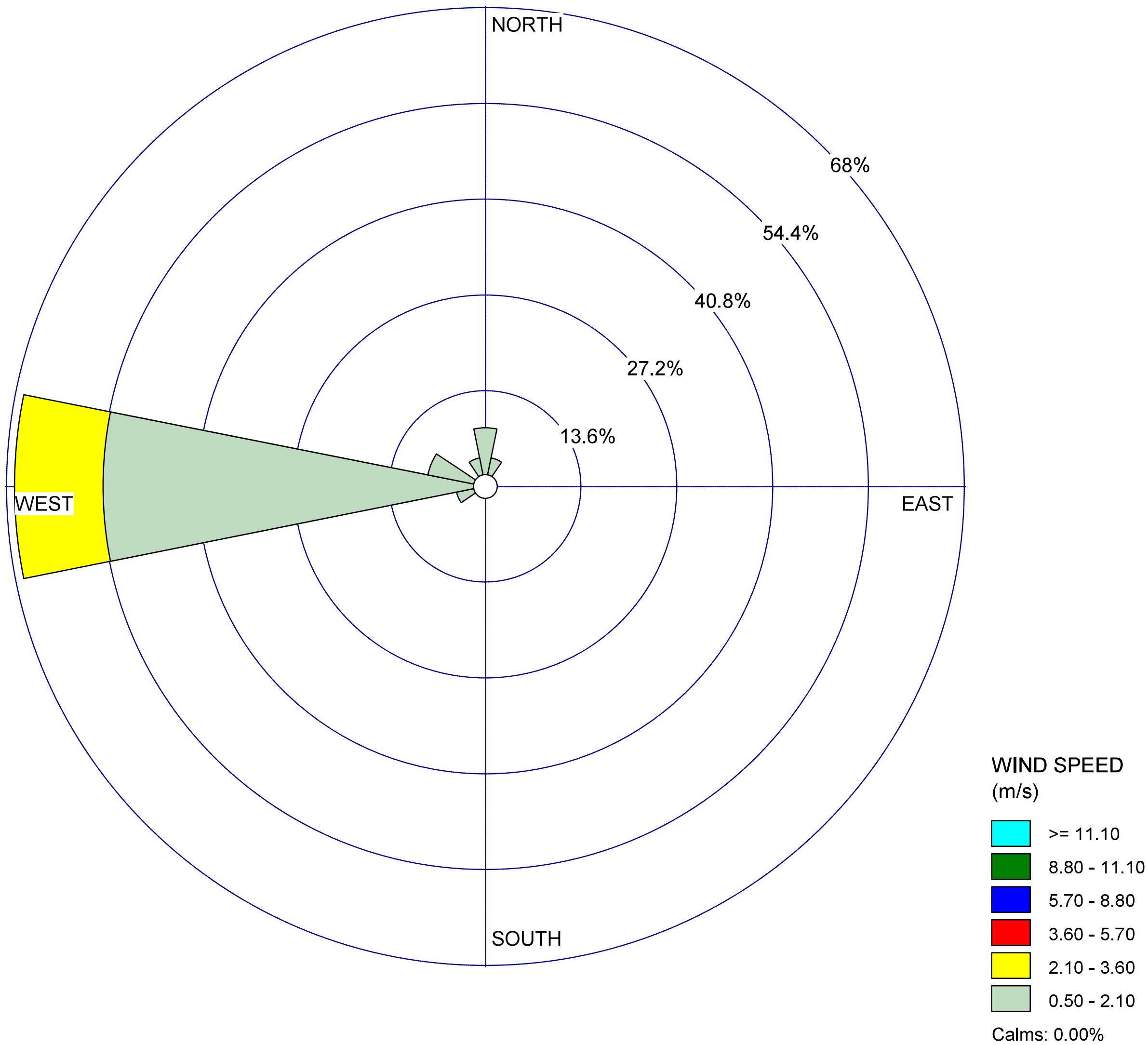
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Alt 2 (5) Cove
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 12/8/2018 - 00:00** **End Date: 12/9/2018 - 07:00**	COMPANY NAME: **BCX Environmental Consulting**
		MODELER: **CS**
	CALM WINDS: **0.00%**	TOTAL COUNT: **23 hrs.**
	AVG. WIND SPEED: **1.42 m/s**	DATE: **3/5/2019**
		PROJECT NO.: **1003-01.42**

BCX ENVIRONMENTAL CONSULTING

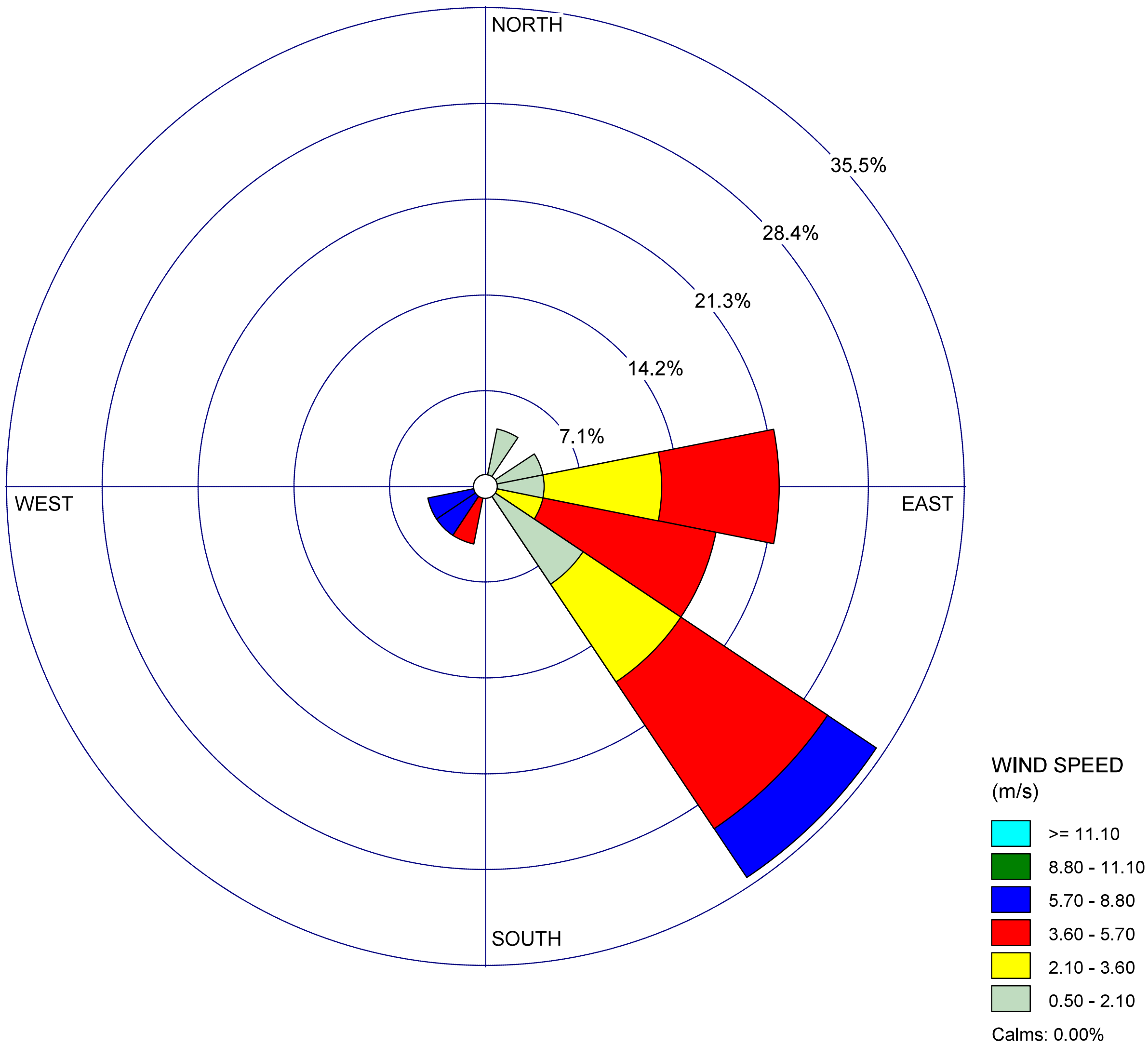
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Alt 1 Dock
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 10/3/2018 - 00:00** **End Date: 10/4/2018 - 08:00**	COMPANY NAME: **BCX Environmental Consulting**
		MODELER: **CS**
	CALM WINDS: **0.00%**	TOTAL COUNT: **22 hrs.**
	AVG. WIND SPEED: **3.84 m/s**	DATE: **3/5/2019**
		PROJECT NO.: **1003-01.42**

BCX ENVIRONMENTAL CONSULTING

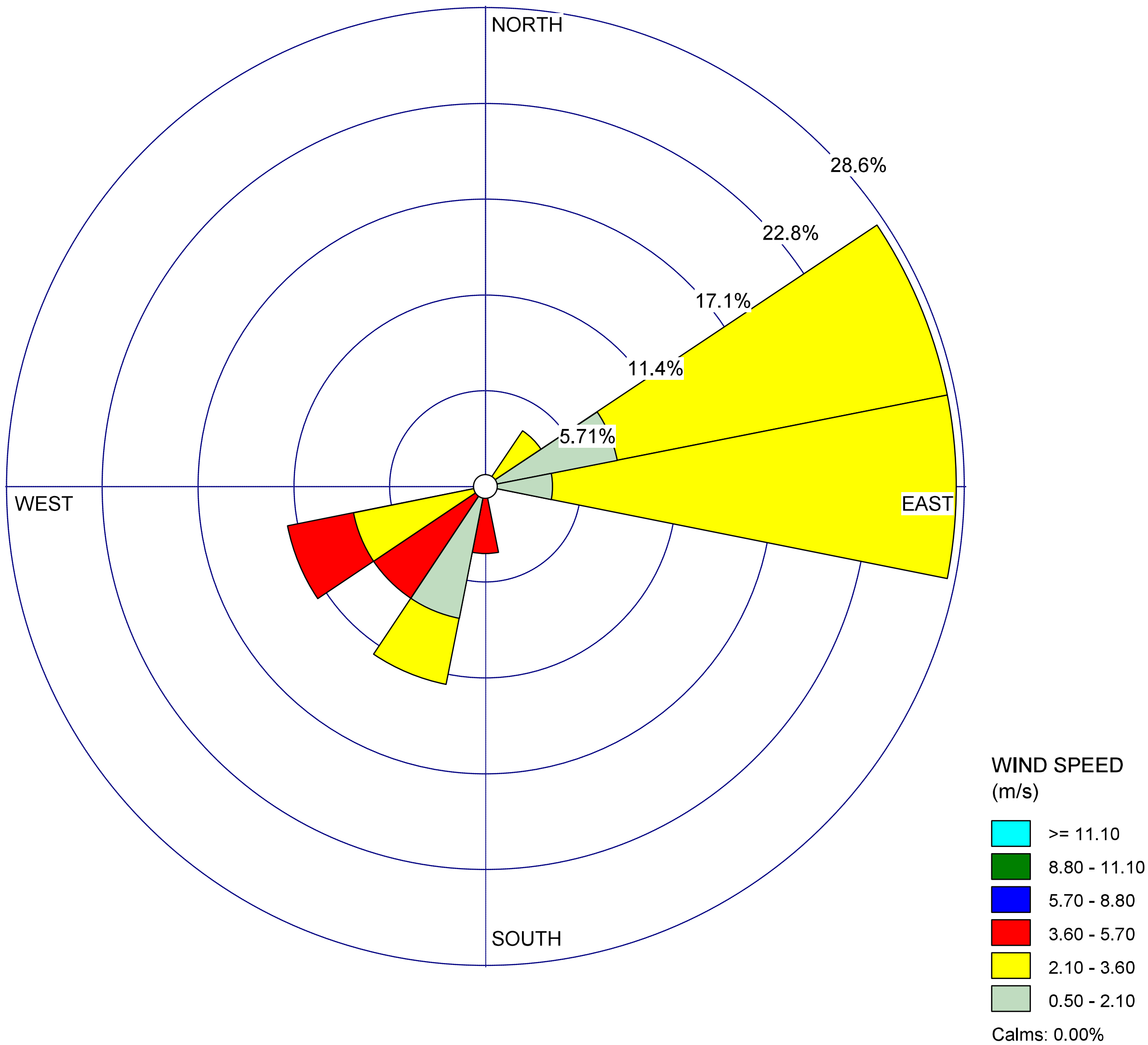
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Alt 2 Dock
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 10/10/2018 - 00:00 **End Date: 10/11/2018 - 08:00**	**BCX Environmental Consulting**	
		MODELER: **CS**	BCX ENVIRONMENTAL CONSULTING
	CALM WINDS: **0.00%**	TOTAL COUNT: **24 hrs.**	
	AVG. WIND SPEED: **2.68 m/s**	DATE: **3/5/2019**	PROJECT NO.: **1003-01.42**

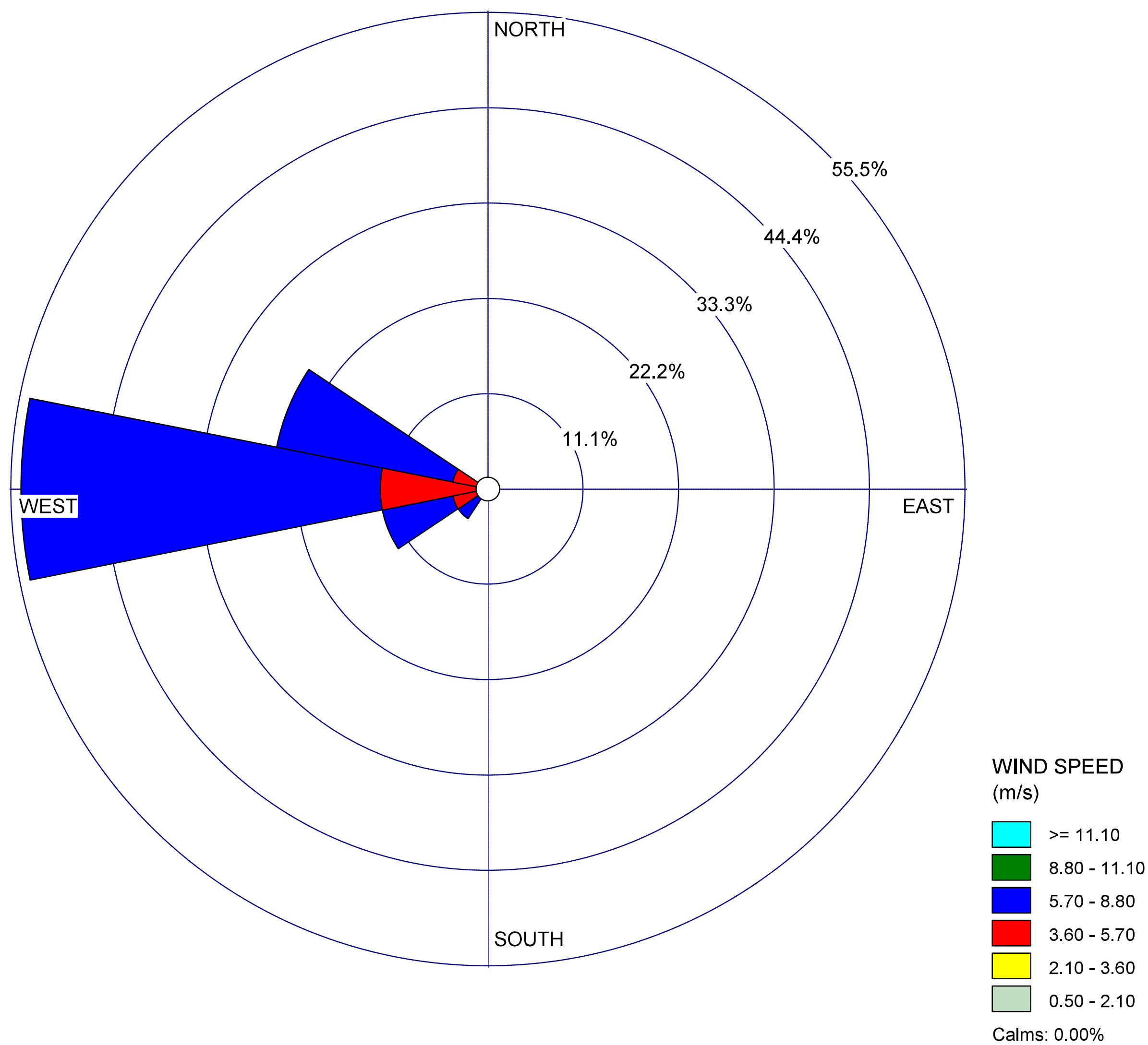
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Alt 3 Dock
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 10/11/2018 - 00:00** **End Date: 10/12/2018 - 08:00**	COMPANY NAME: **BCX Environmental Consulting**	
		MODELER: **CS**	BCX ENVIRONMENTAL CONSULTING
	CALM WINDS: **0.00%**	TOTAL COUNT: **23 hrs.**	
	AVG. WIND SPEED: **6.17 m/s**	DATE: **3/5/2019**	PROJECT NO.: **1003-01.42**

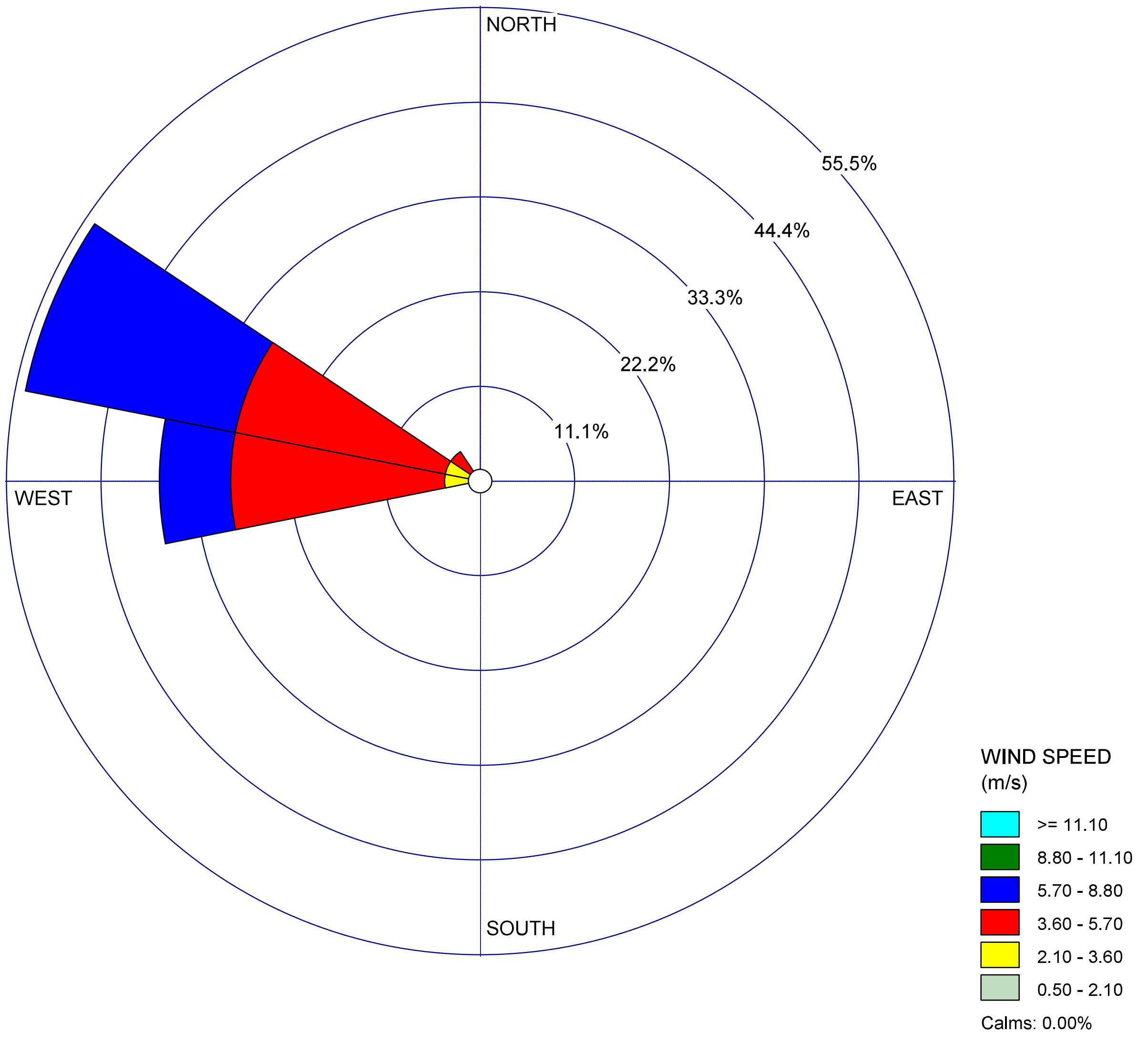
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Alt 4 Dock
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 10/12/2018 - 00:00 **End Date: 10/13/2018 - 08:00**	**BCX Environmental Consulting**	
		MODELER: **CS**	BCX ENVIRONMENTAL CONSULTING
	CALM WINDS: **0.00%**	TOTAL COUNT: **23 hrs.**	
	AVG. WIND SPEED: **5.07 m/s**	DATE: **3/5/2019**	PROJECT NO.: **1003-01.42**

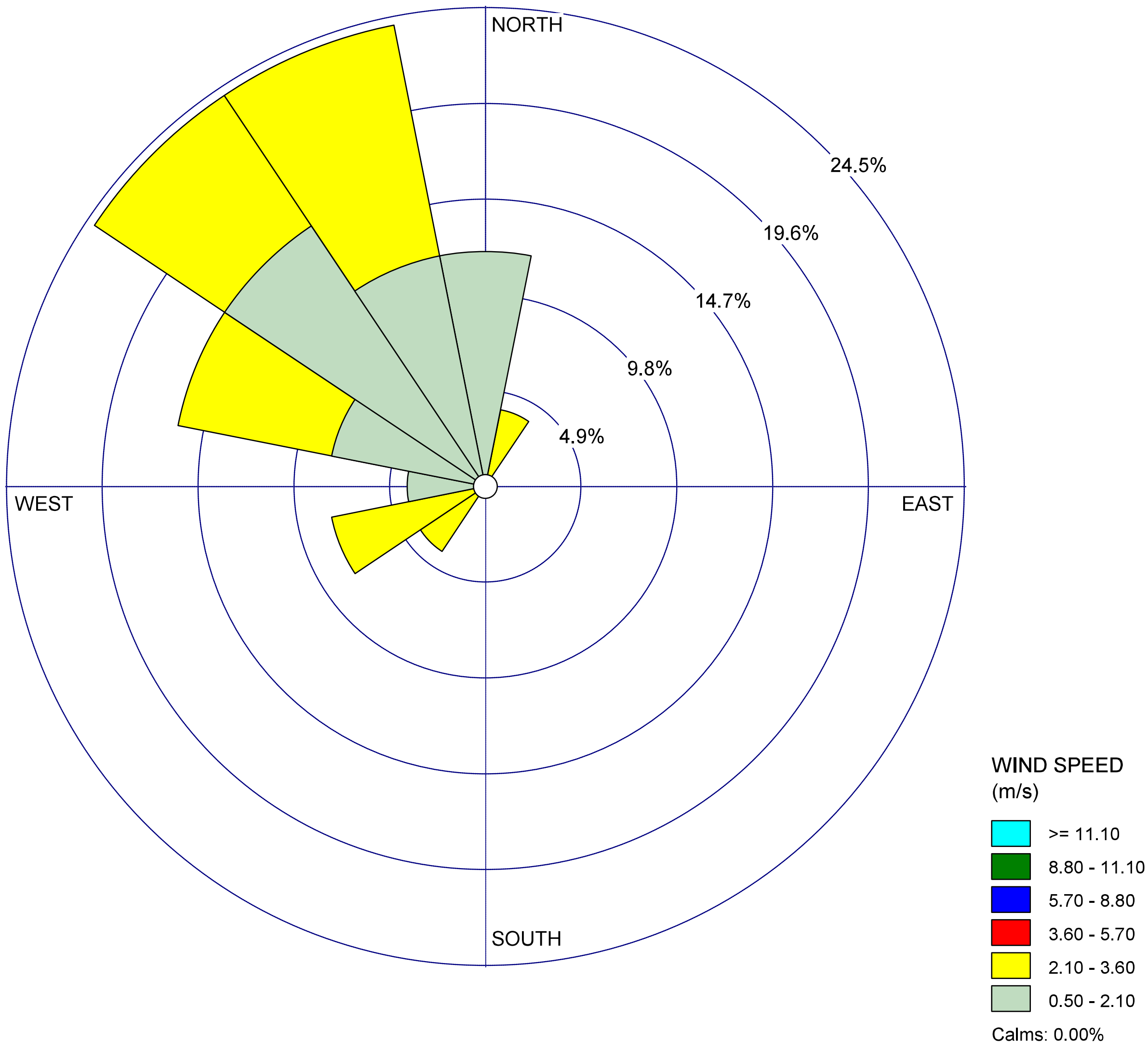
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Alt 2 (1) Dock
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 12/4/2018 - 00:00** **End Date: 12/5/2018 - 23:00**	COMPANY NAME: **BCX Environmental Consulting**	
		MODELER: **CS**	BCX ENVIRONMENTAL CONSULTING
	CALM WINDS: **0.00%**	TOTAL COUNT: **24 hrs.**	
	AVG. WIND SPEED: **1.96 m/s**	DATE: **3/5/2019**	PROJECT NO.: **1003-01.42**

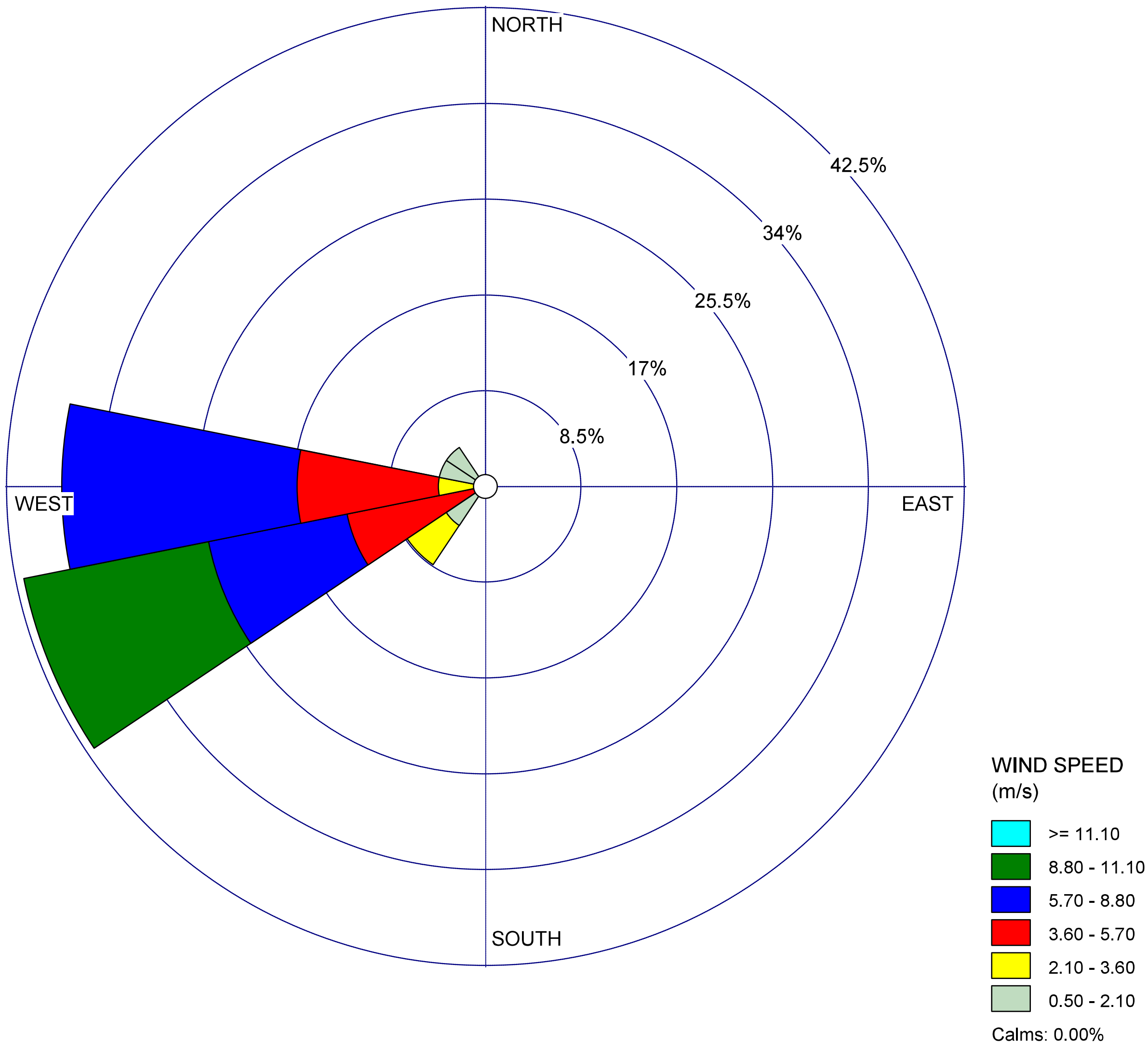
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Alt 2 (2) Dock
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:

DATA PERIOD:

Start Date: 12/5/2018 - 00:00
End Date: 12/6/2018 - 08:00

COMPANY NAME:

BCX Environmental Consulting

MODELER:

CS

CALM WINDS:

0.00%

TOTAL COUNT:

23 hrs.

BCX ENVIRONMENTAL CONSULTING

AVG. WIND SPEED:

6.10 m/s

DATE:

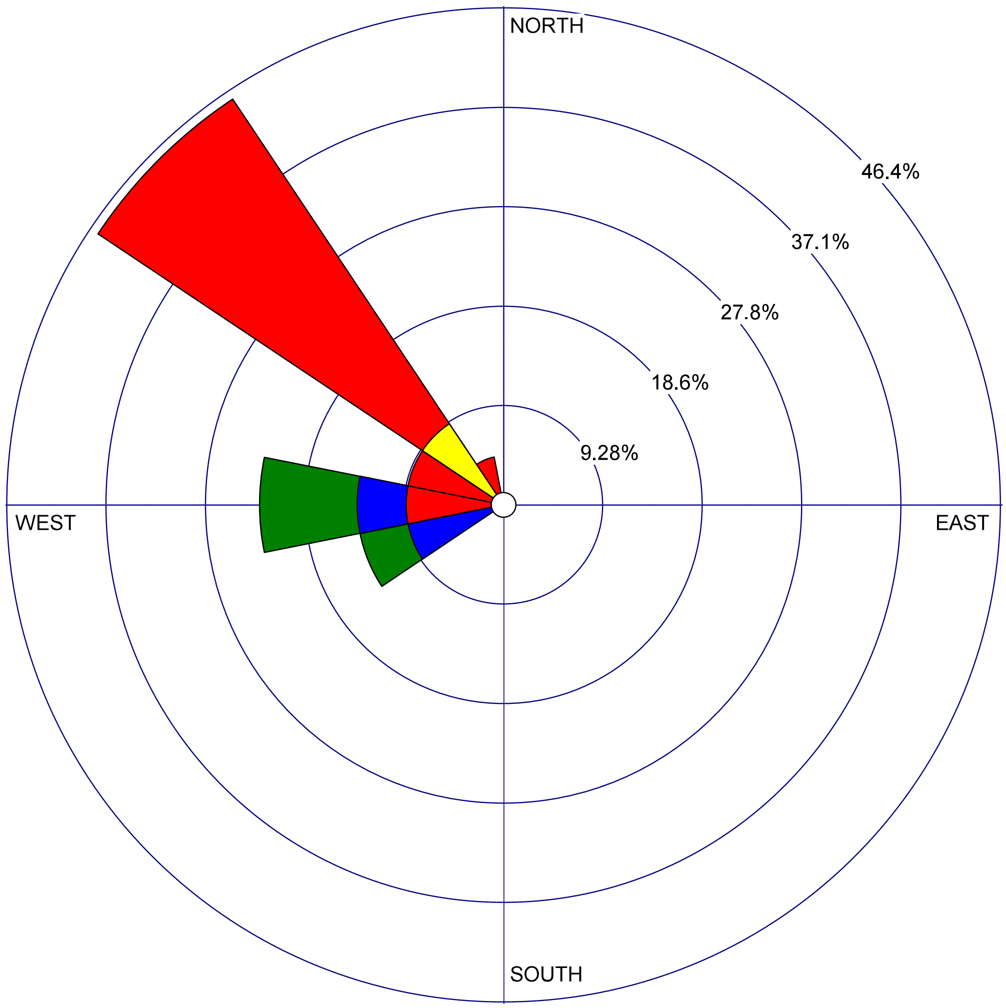
3/5/2019

PROJECT NO.:

1003-01.42

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:	DISPLAY:
Alt 2 (3) Dock **Version 16216r**	**Wind Speed** **Direction (blowing from)**



WIND SPEED (m/s)

- >= 11.10
- 8.80 - 11.10
- 5.70 - 8.80
- 3.60 - 5.70
- 2.10 - 3.60
- 0.50 - 2.10

Calms: 0.00%

COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 12/6/2018 - 00:00 **End Date: 12/7/2018 - 06:00**	**BCX Environmental Consulting**	
		MODELER: **CS**	BCX ENVIRONMENTAL CONSULTING
	CALM WINDS: **0.00%**	TOTAL COUNT: **21 hrs.**	
	AVG. WIND SPEED: **5.41 m/s**	DATE: **3/5/2019**	PROJECT NO.: **1003-01.42**

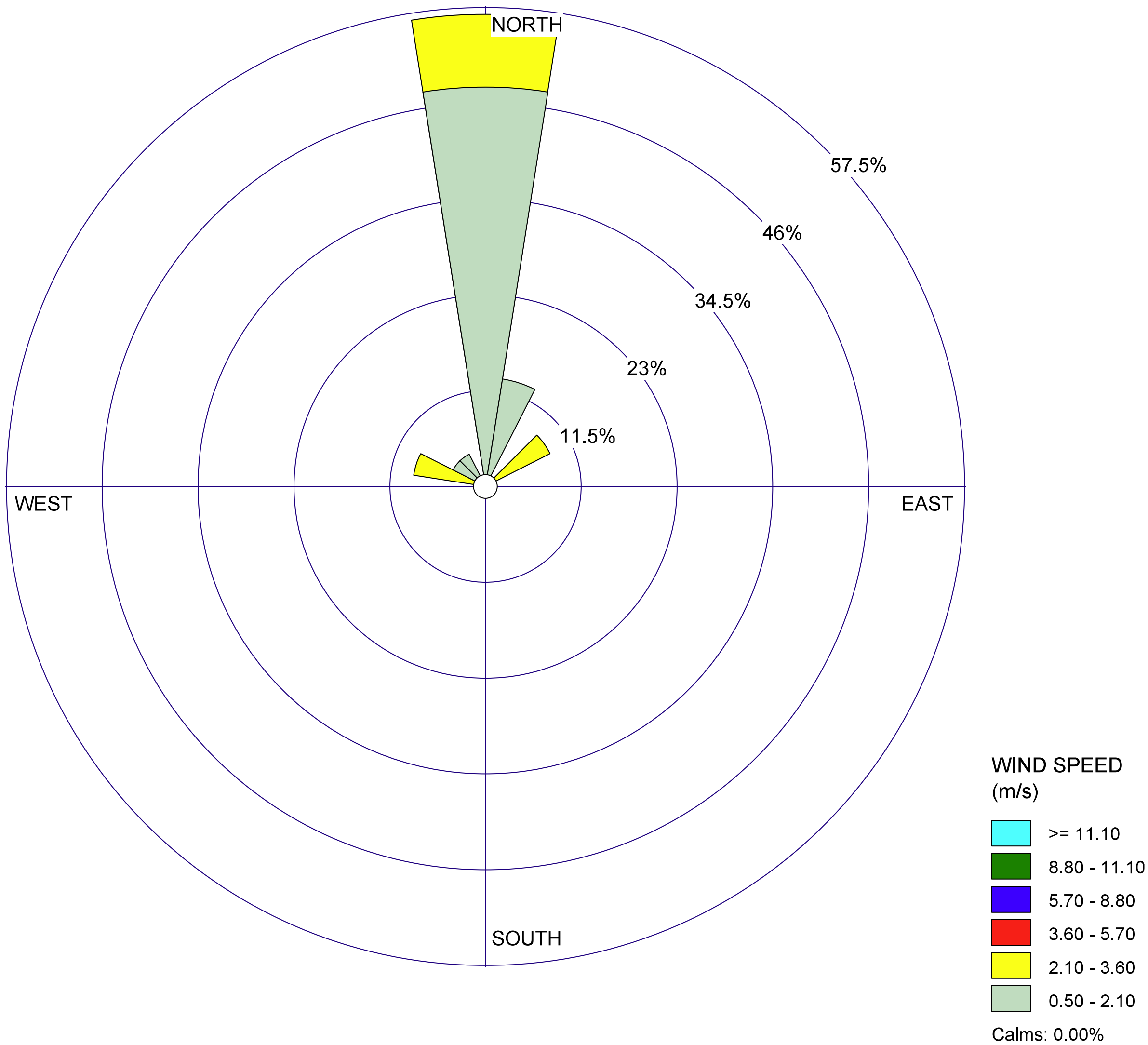
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Baseline 1 - Dock
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
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		MODELER: **JA**	BCX ENVIRONMENTAL CONSULTING
	CALM WINDS: **0.00%**	TOTAL COUNT: **22 hrs.**	
	AVG. WIND SPEED: **1.78 m/s**	DATE: **2019-03-05**	PROJECT NO.: **1003-01.42**

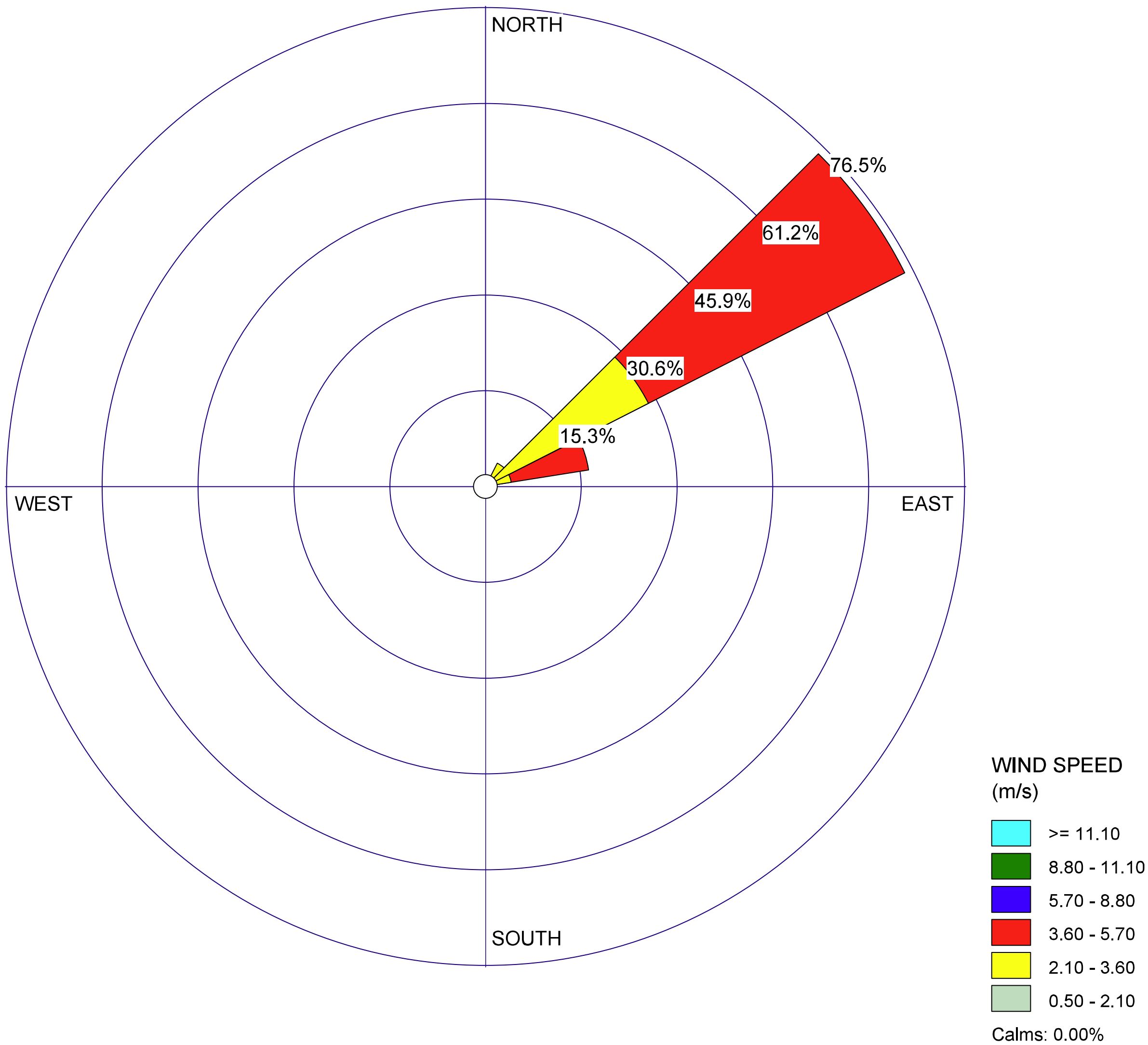
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Baseline 2 - Dock
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 2018-10-01 - 00:00 **End Date: 2018-10-02 - 08:00**	**BCX Environmental Consulting**	
		MODELER: **JA**	
	CALM WINDS: **0.00%**	TOTAL COUNT: **23 hrs.**	
	AVG. WIND SPEED: **3.63 m/s**	DATE: **2019-03-05**	PROJECT NO.: **1003-01.42**

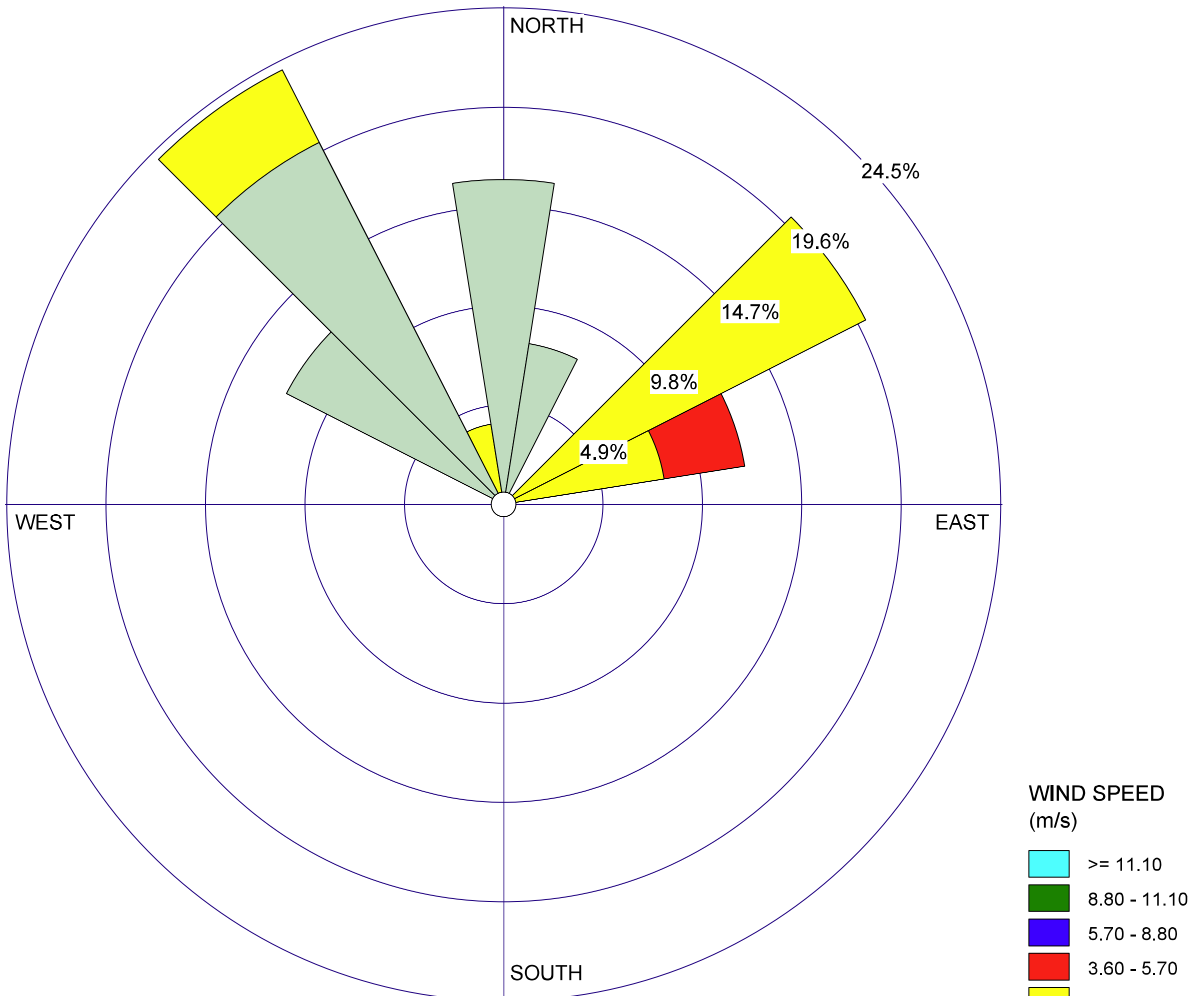
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Baseline 3 - Dock
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



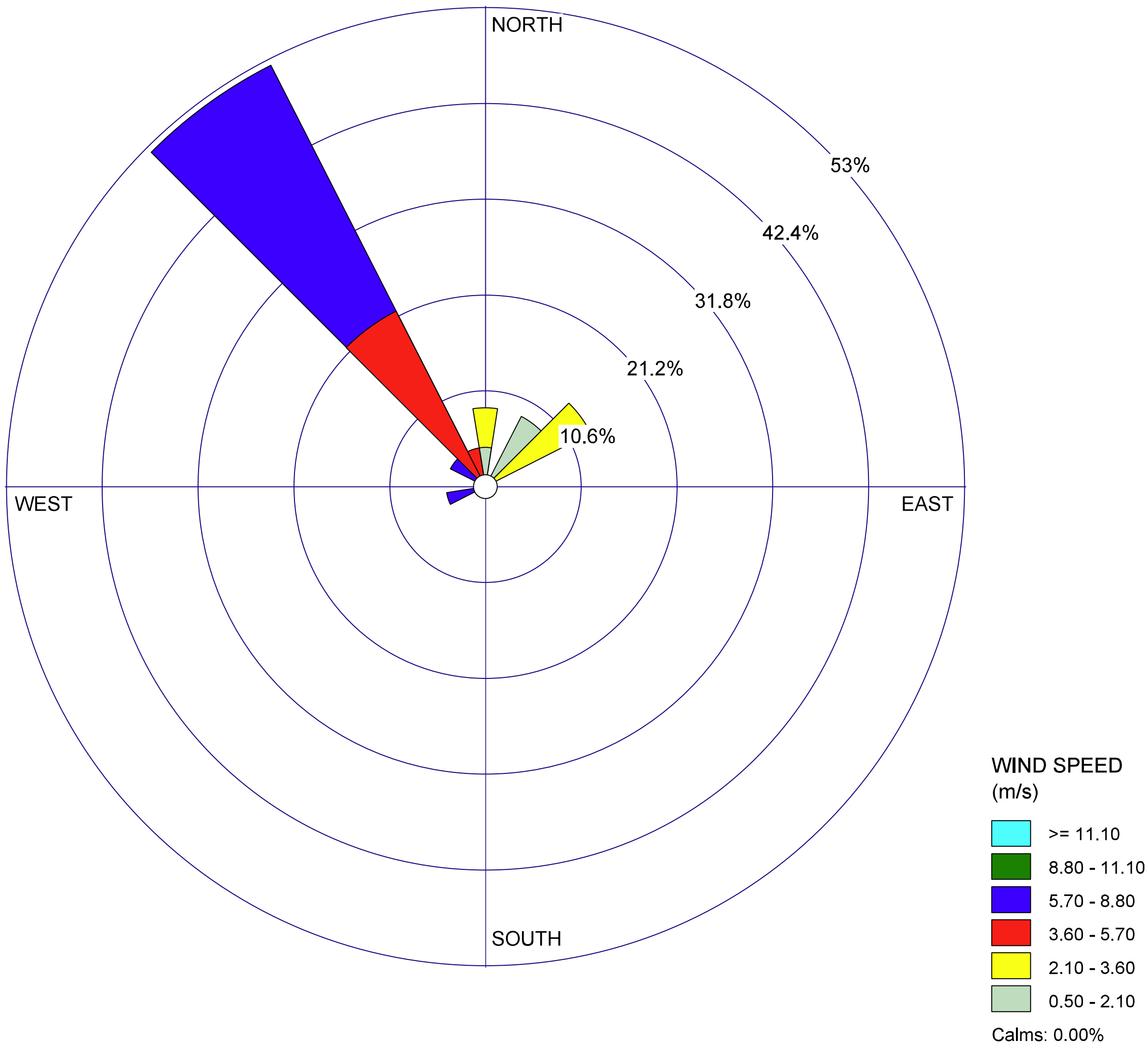
COMMENTS:	DATA PERIOD: **Start Date: 2018-10-02 - 00:00** **End Date: 2018-10-03 - 09:00**	COMPANY NAME: **BCX Environmental Consulting**	
		MODELER: **JA**	
	CALM WINDS: **0.00%**	TOTAL COUNT: **24 hrs.**	
	AVG. WIND SPEED: **2.04 m/s**	DATE: **2019-03-05**	PROJECT NO.: **1003-01.42**

WIND ROSE PLOT:

Baseline 4 - Dock
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:

DATA PERIOD:

Start Date: 2018-10-04 - 00:00
End Date: 2018-10-05 - 07:00

COMPANY NAME:

BCX Environmental Consulting

MODELER:

JA

CALM WINDS:

0.00%

TOTAL COUNT:

22 hrs.

AVG. WIND SPEED:

4.95 m/s

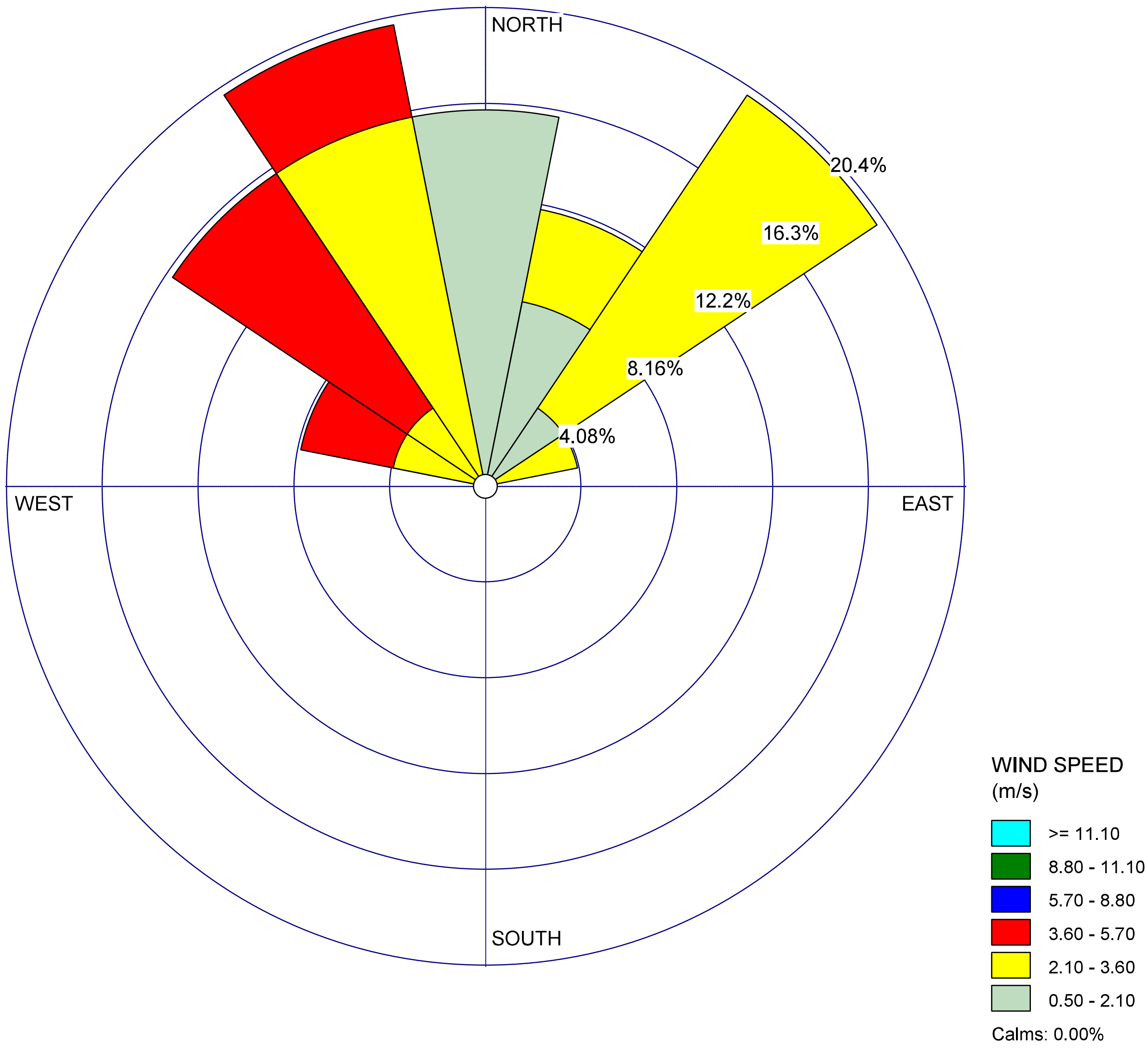
DATE:

2019-03-05

PROJECT NO.:

1003-01.42

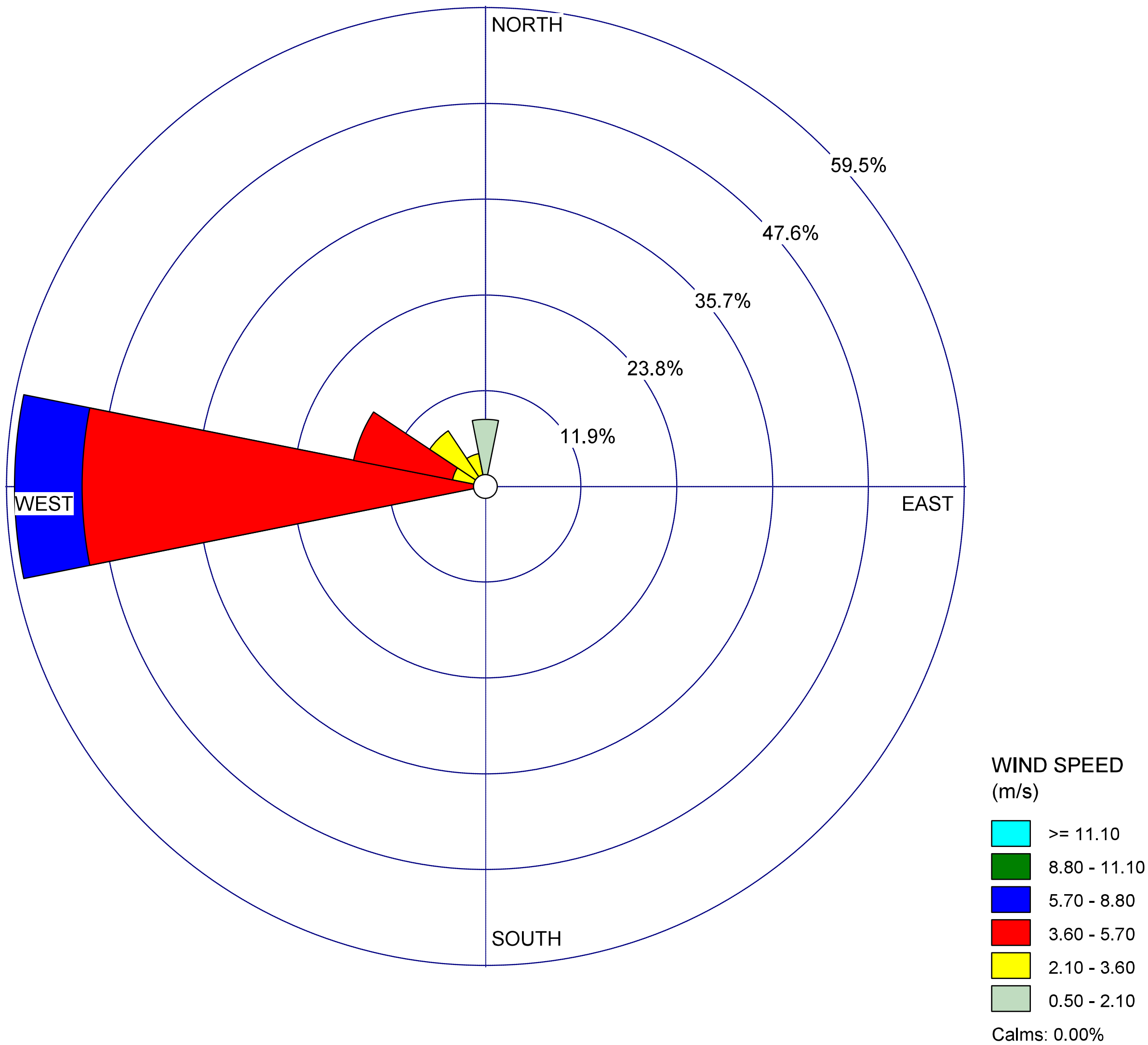
WIND ROSE PLOT:	DISPLAY:
Alt 2 (4) Dock **Version 16216r**	**Wind Speed** **Direction (blowing from)**



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 12/7/2018 - 00:00 **End Date: 12/8/2018 - 07:00**	**BCX Environmental Consulting**	
		MODELER: **CS**	BCX ENVIRONMENTAL CONSULTING
	CALM WINDS: **0.00%**	TOTAL COUNT: **24 hrs.**	
	AVG. WIND SPEED: **2.65 m/s**	DATE: **3/5/2019**	PROJECT NO.: **1003-01.42**

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:	DISPLAY:
Alt 2 (5) Dock **Version 16216r**	**Wind Speed** **Direction (blowing from)**



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 12/6/2018 - 00:00 **End Date: 12/8/2018 - 23:00**	**BCX Environmental Consulting**	
		MODELER: **CS**	BCX ENVIRONMENTAL CONSULTING
	CALM WINDS: **0.00%**	TOTAL COUNT: **23 hrs.**	
	AVG. WIND SPEED: **3.96 m/s**	DATE: **3/5/2019**	PROJECT NO.: **1003-01.42**

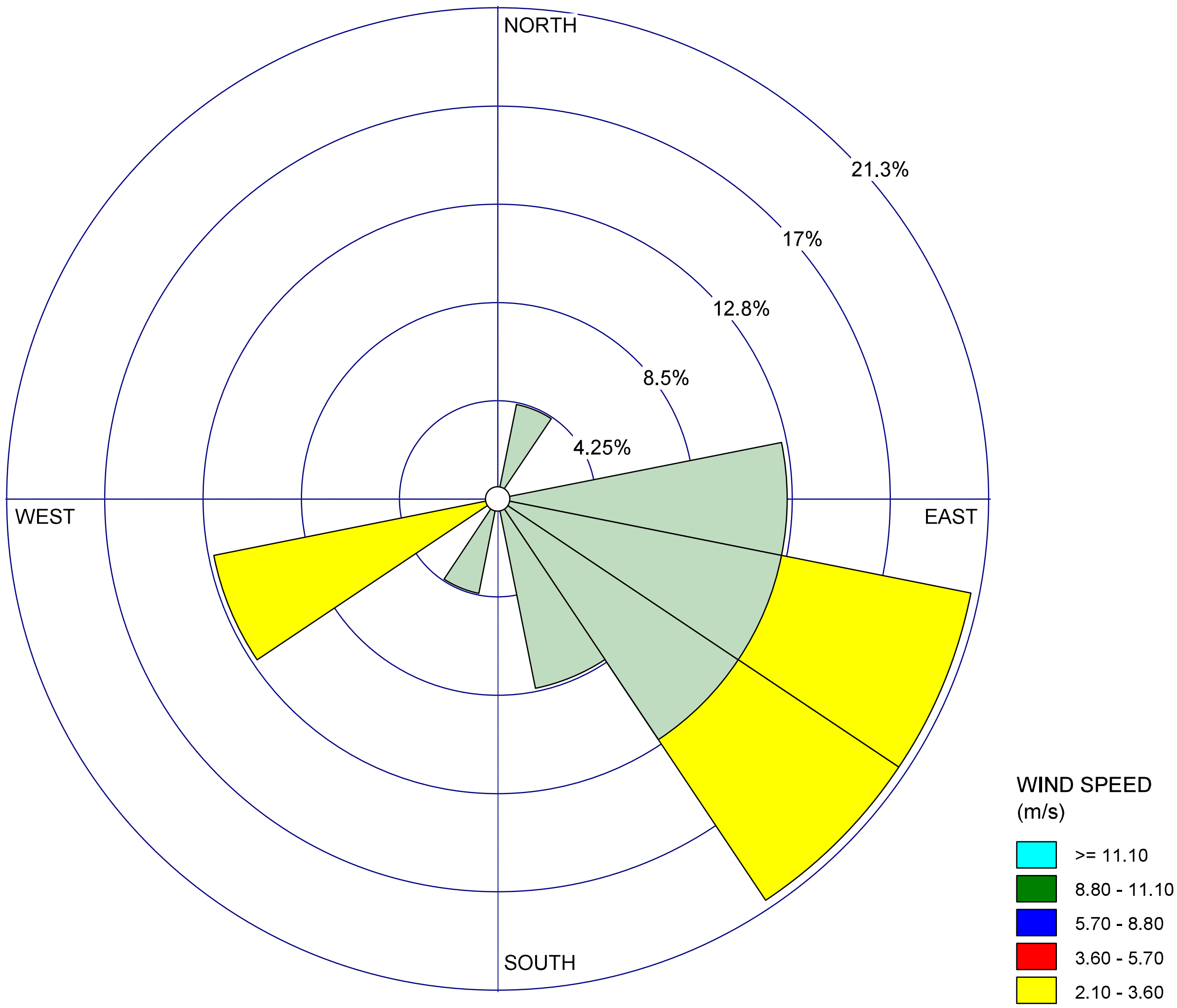
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Alt 1 - OPG Gate
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 10/3/2018 - 00:00** **End Date: 10/4/2018 - 07:00**	COMPANY NAME: **BCX Environmental Consulting**	
		MODELER: **CS**	BCX ENVIRONMENTAL CONSULTING
	CALM WINDS: **12.50%**	TOTAL COUNT: **23 hrs.**	
	AVG. WIND SPEED: **1.33 m/s**	DATE: **3/5/2019**	PROJECT NO.: **1003-01.42**

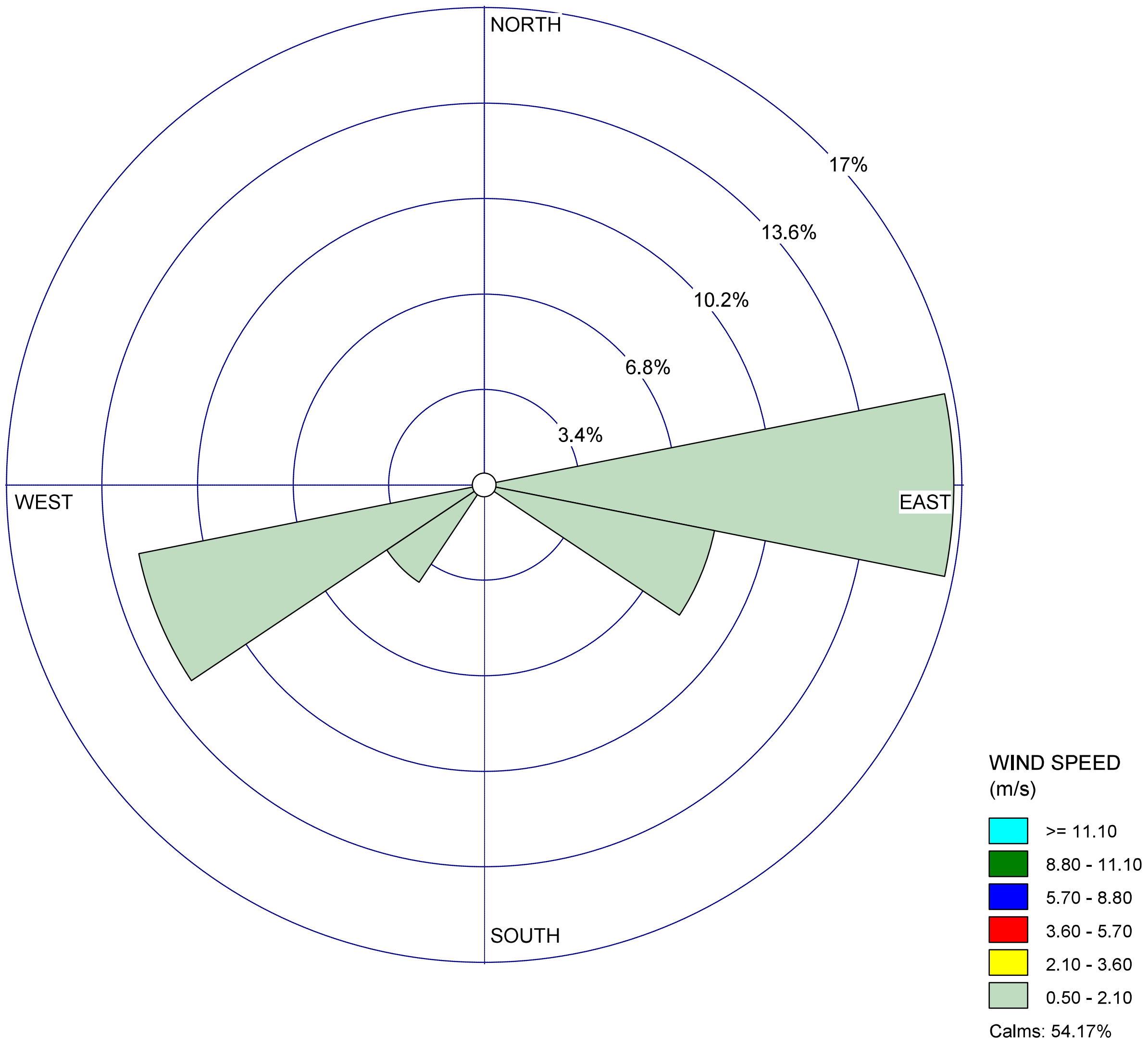
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Alt 3 - OPG Gate
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 10/10/2018 - 00:00 **End Date: 10/11/2018 - 07:00**	**BCX Environmental Consulting**	
		MODELER: **CS**	BCX ENVIRONMENTAL CONSULTING
	CALM WINDS: **54.17%**	TOTAL COUNT: **23 hrs.**	
	AVG. WIND SPEED: **0.34 m/s**	DATE: **3/5/2019**	PROJECT NO.: **1003-01.42**

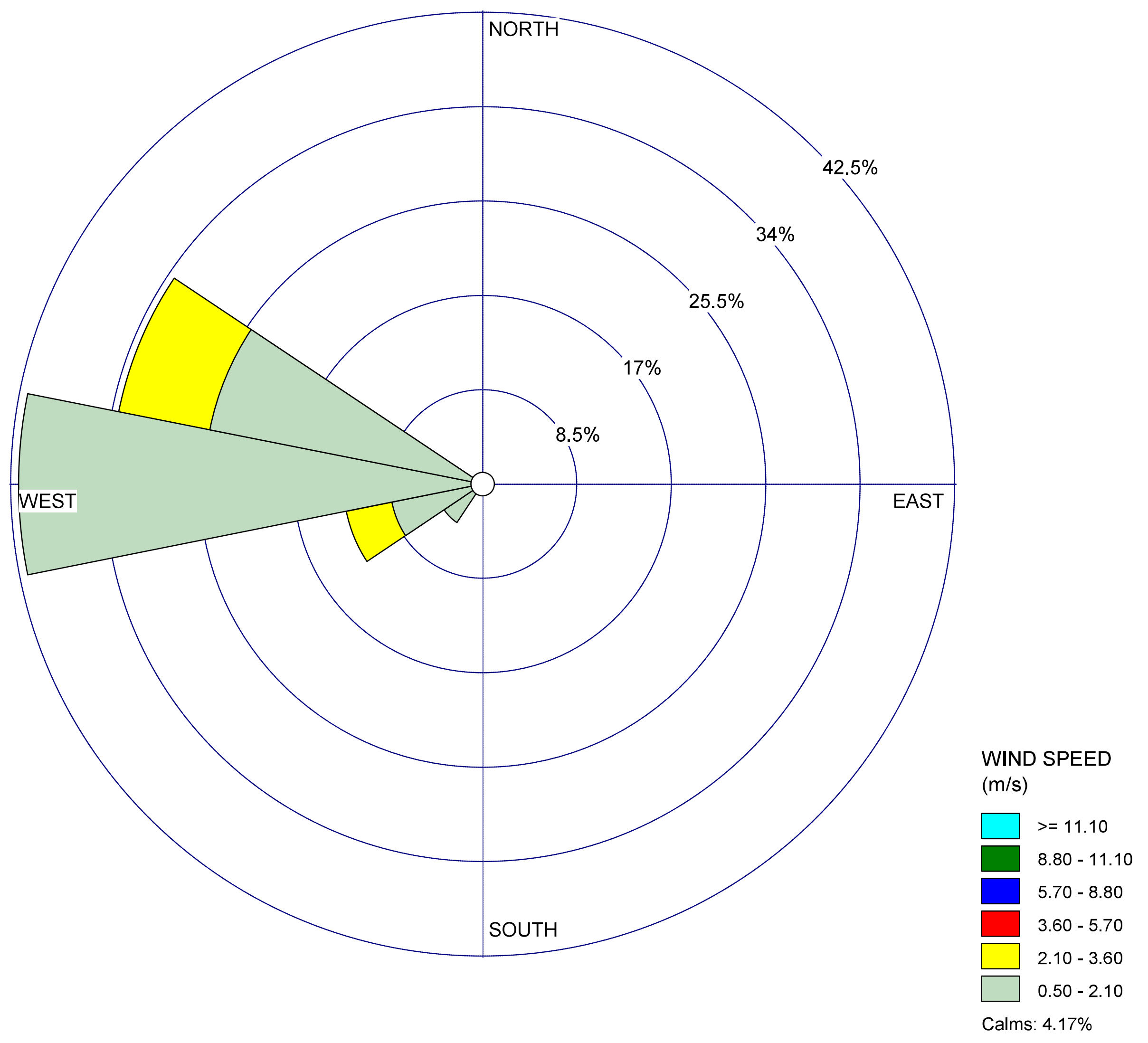
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Alt 3 - OPG Gate
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 10/11/2018 - 00:00 **End Date: 10/12/2018 - 07:00**	**BCX Environmental Consulting**	
		MODELER: **CS**	BCX ENVIRONMENTAL CONSULTING
	CALM WINDS: **4.17%**	TOTAL COUNT: **23 hrs.**	
	AVG. WIND SPEED: **1.38 m/s**	DATE: **3/5/2019**	PROJECT NO.: **1003-01.42**

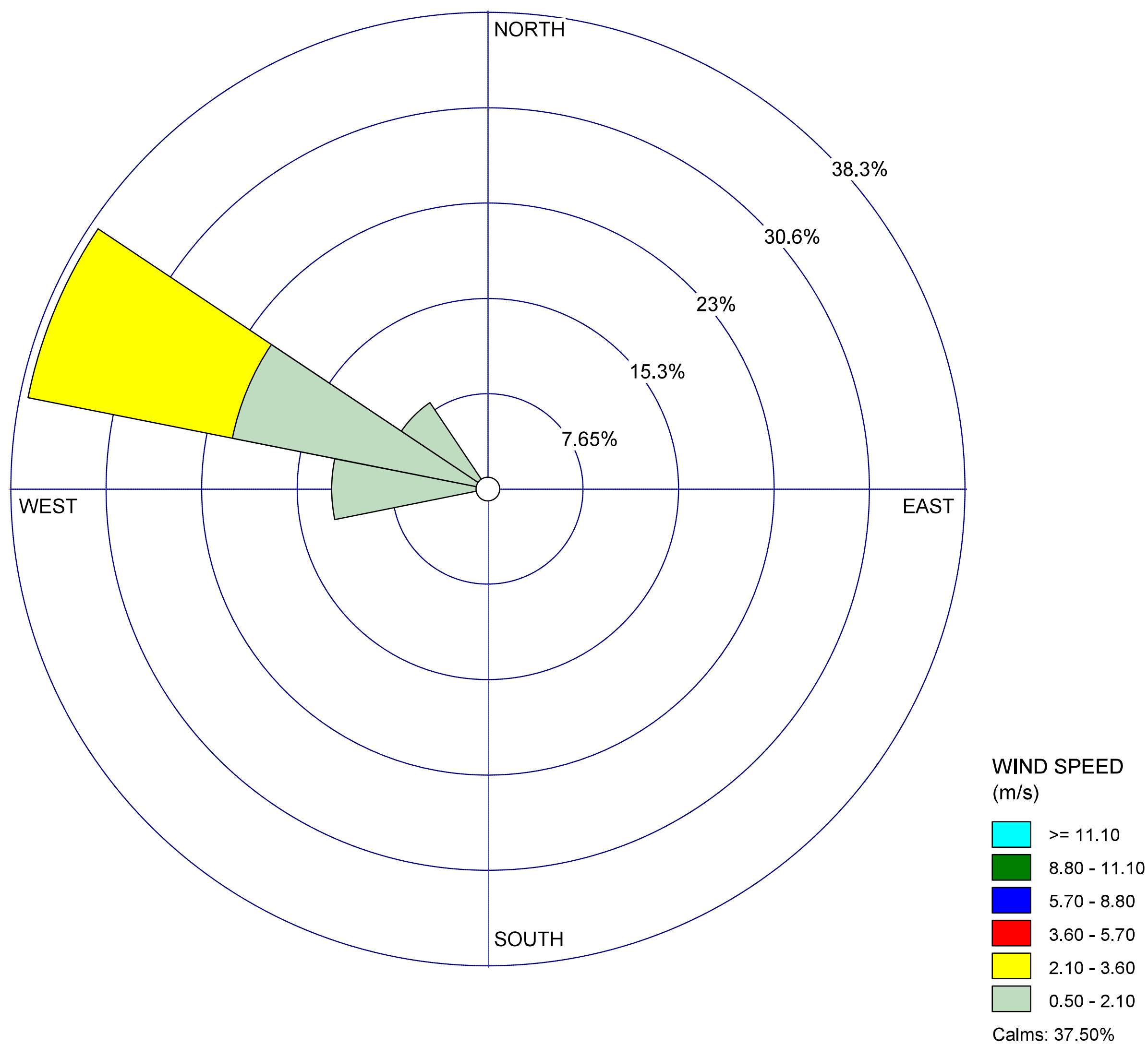
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Alt 4 - OPG Gate
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:

DATA PERIOD:

Start Date: 10/12/2018 - 00:00
End Date: 10/13/2018 - 07:00

COMPANY NAME:

BCX Environmental Consulting

MODELER:

CS

BCX ENVIRONMENTAL CONSULTING

CALM WINDS:

37.50%

TOTAL COUNT:

23 hrs.

AVG. WIND SPEED:

1.06 m/s

DATE:

3/5/2019

PROJECT NO.:

1003-01.42

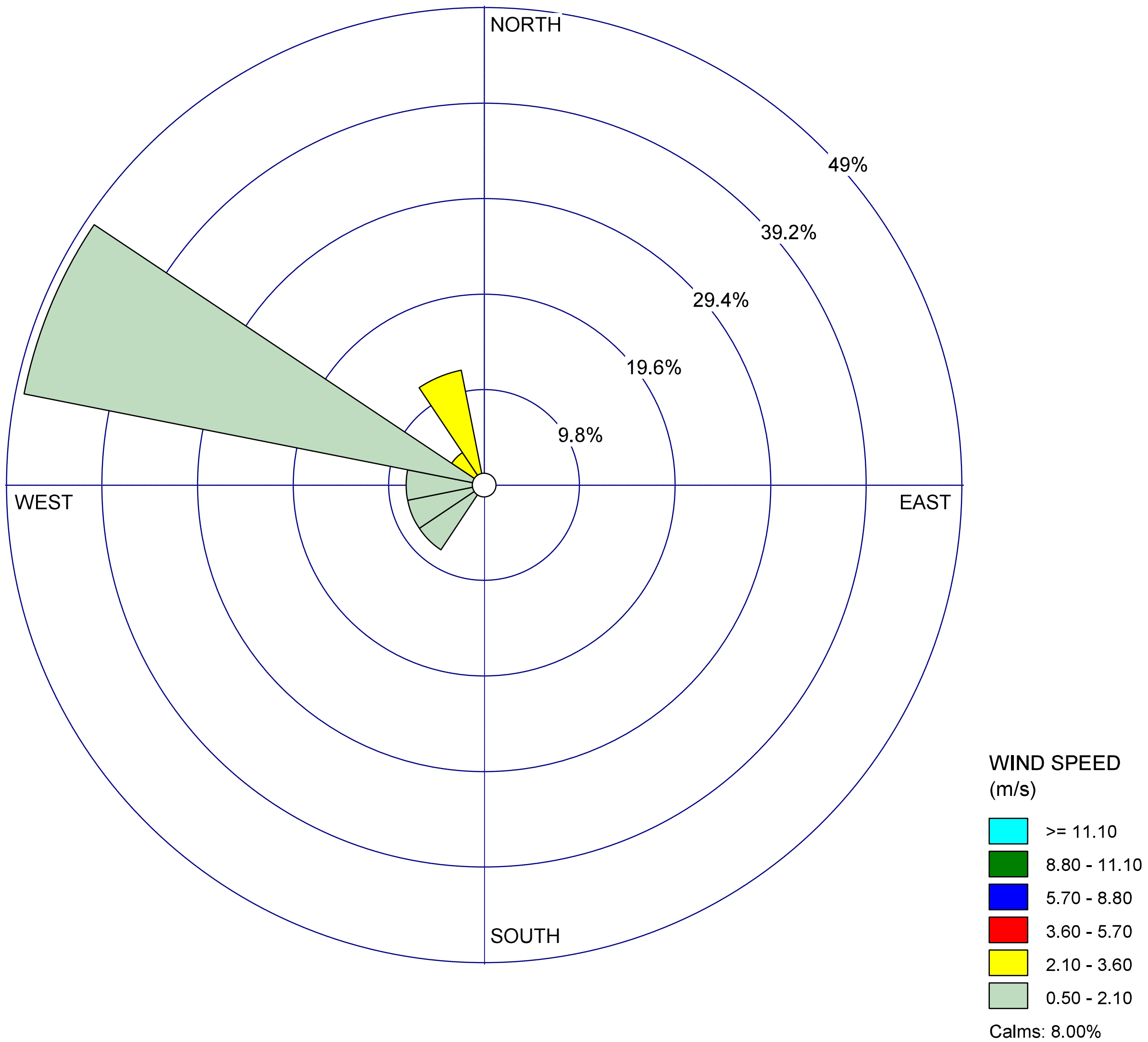
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Alt 2 (1) - OPG Gate
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 12/4/2018 - 00:00** **End Date: 12/5/2018 - 07:00**	COMPANY NAME: **BCX Environmental Consulting**	
		MODELER: **CS**	BCX ENVIRONMENTAL CONSULTING
	CALM WINDS: **8.00%**	TOTAL COUNT: **24 hrs.**	
	AVG. WIND SPEED: **1.23 m/s**	DATE: **3/5/2019**	PROJECT NO.: **1003-01.42**

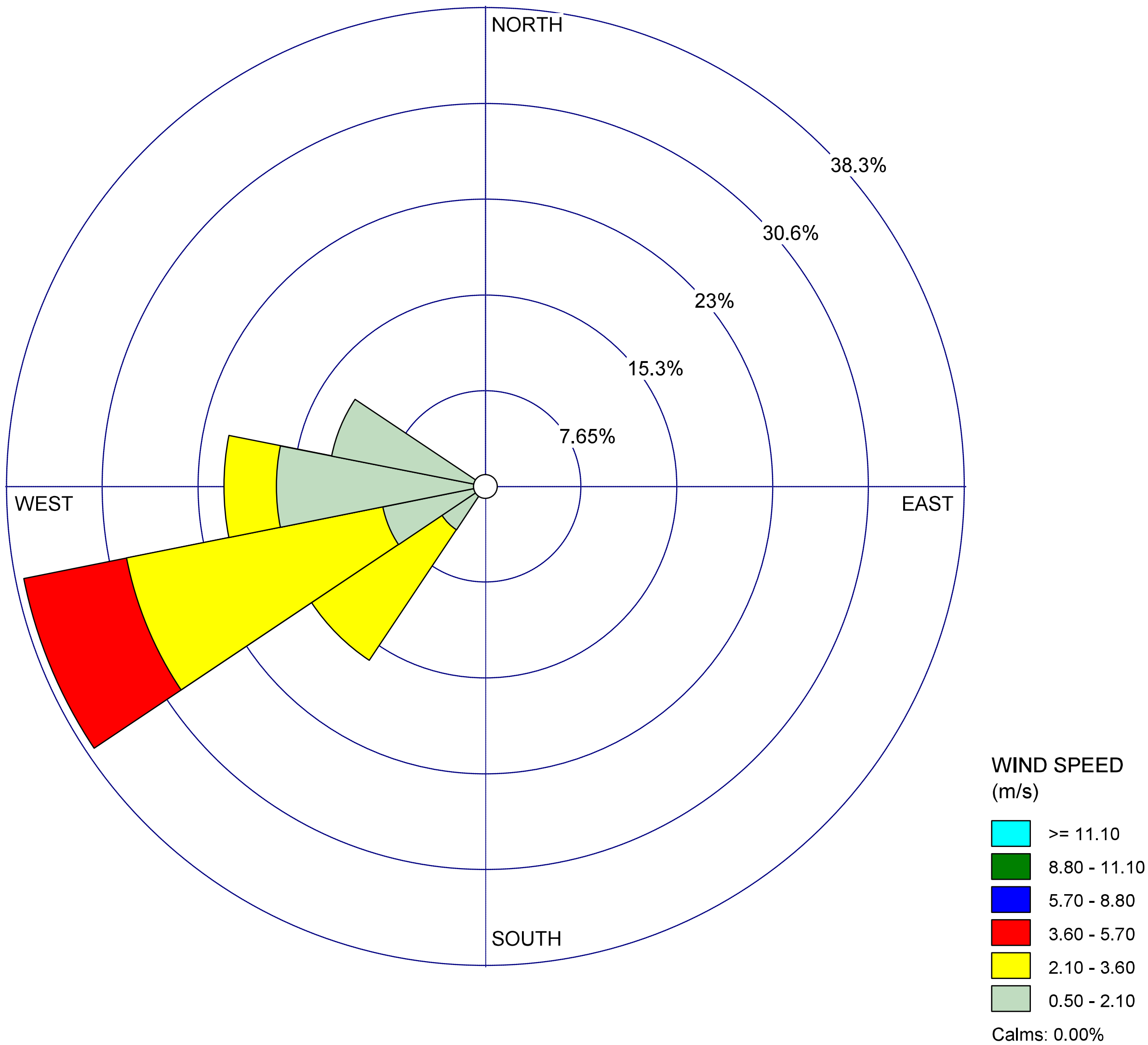
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Alt 2 (2) - OPG Gate
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:

DATA PERIOD:

Start Date: 12/5/2018 - 00:00
End Date: 12/6/2018 - 07:00

COMPANY NAME:

BCX Environmental Consulting

MODELER:

CS

BCX ENVIRONMENTAL CONSULTING

CALM WINDS:

0.00%

TOTAL COUNT:

21 hrs.

AVG. WIND SPEED:

2.20 m/s

DATE:

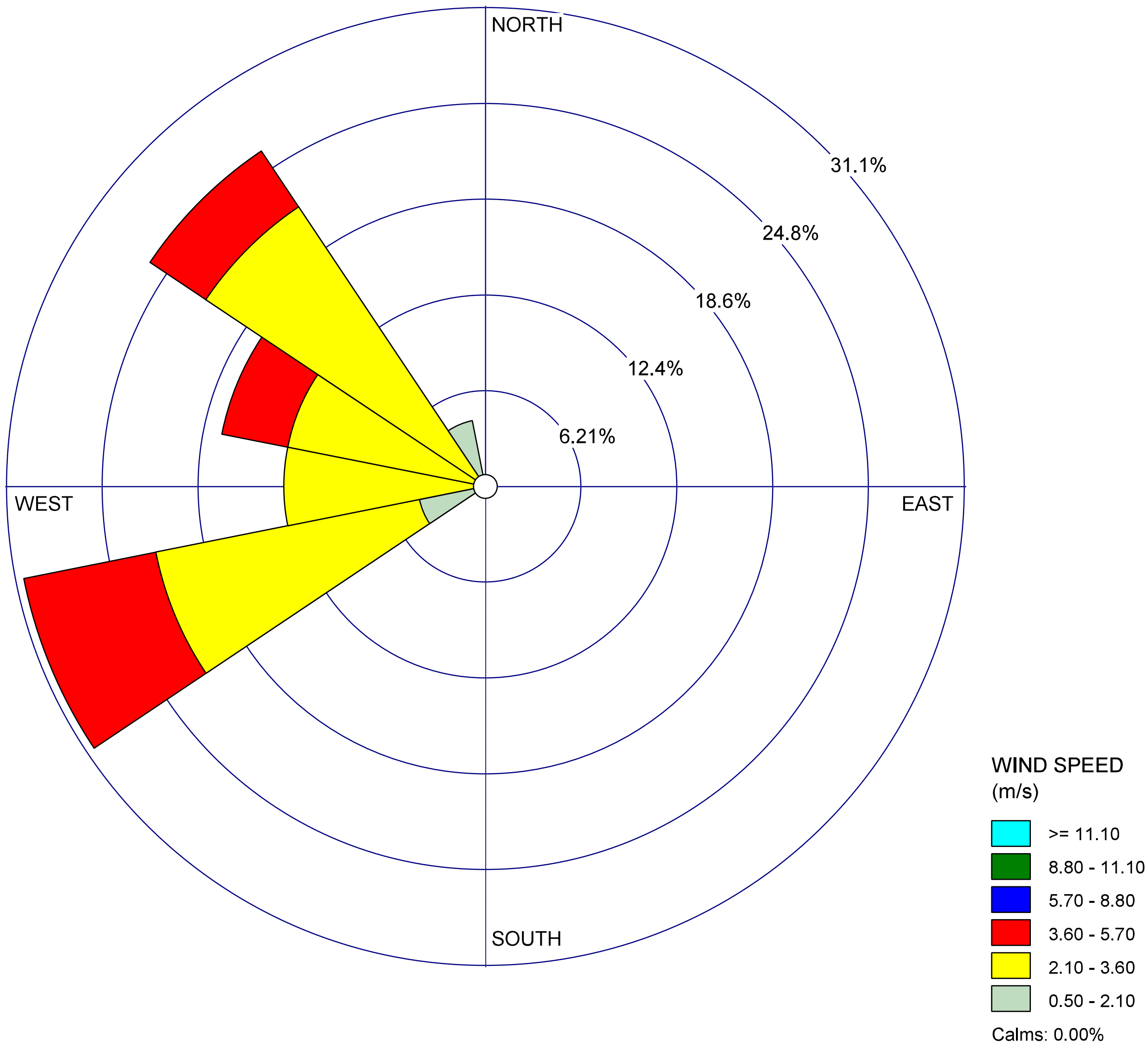
3/5/2019

PROJECT NO.:

1003-01.42

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:	DISPLAY:
Alt 2 (3) - OPG Gate **Version 16216r**	**Wind Speed** **Direction (blowing from)**



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 12/6/2018 - 00:00 **End Date: 12/7/2018 - 06:00**	**BCX Environmental Consulting**	
		MODELER: **CS**	BCX ENVIRONMENTAL CONSULTING
	CALM WINDS: **0.00%**	TOTAL COUNT: **21 hrs.**	
	AVG. WIND SPEED: **2.80 m/s**	DATE: **3/5/2019**	PROJECT NO.: **1003-01.42**

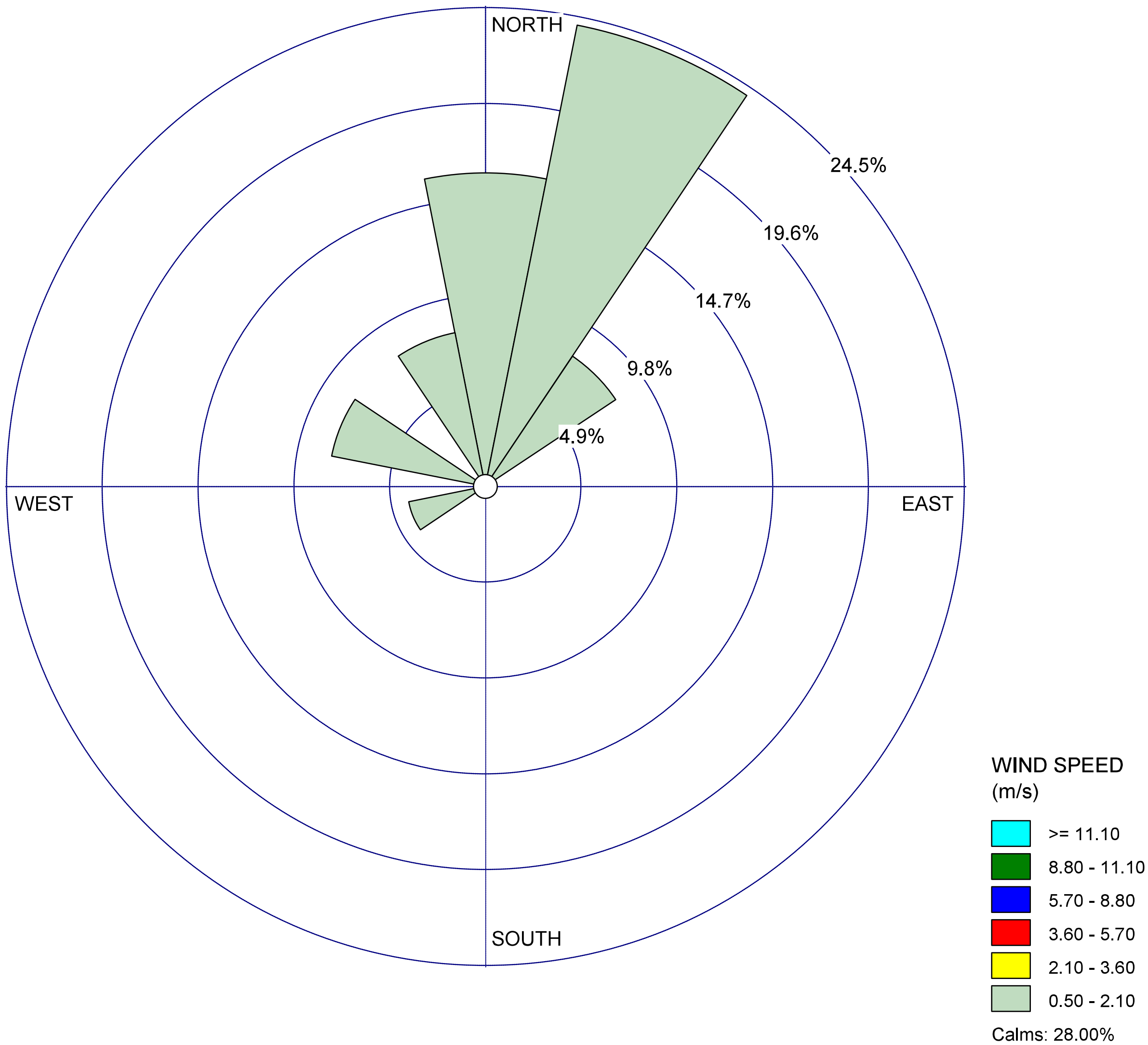
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Baseline 1 - OPG Gate
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 9/30/2018 - 00:00 **End Date: 10/1/2018 - 08:00**	**BCX Environmental Consulting**	
		MODELER: **CS**	BCX ENVIRONMENTAL CONSULTING
	CALM WINDS: **28.00%**	TOTAL COUNT: **24 hrs.**	
	AVG. WIND SPEED: **0.85 m/s**	DATE: **3/5/2019**	PROJECT NO.: **1003-01.42**

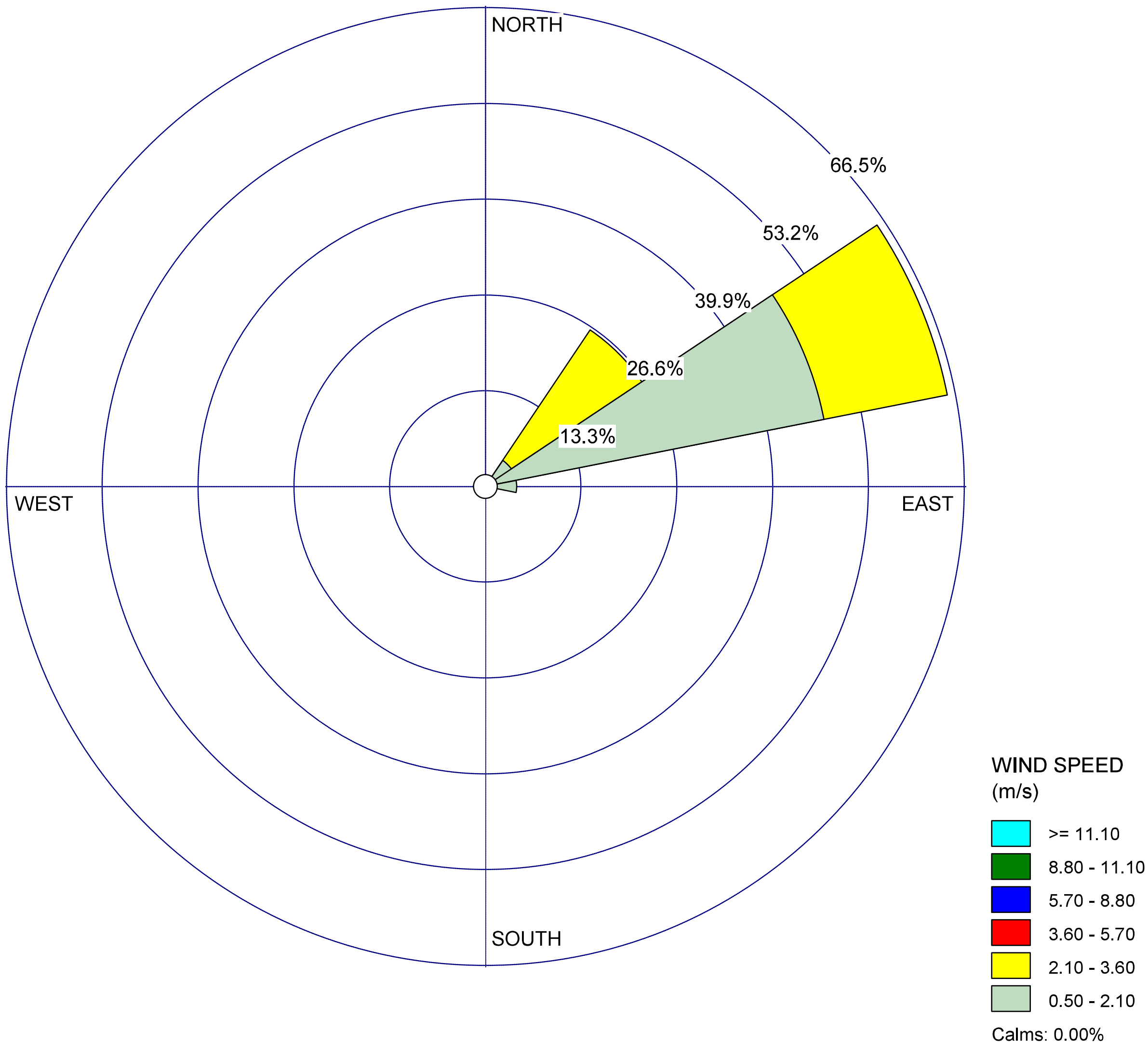
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Baseline 2 - OPG Gate
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 9/30/2018 - 00:00** **End Date: 10/2/2018 - 07:00**	COMPANY NAME: **BCX Environmental Consulting**	
		MODELER: **CS**	BCX ENVIRONMENTAL CONSULTING
	CALM WINDS: **0.00%**	TOTAL COUNT: **22 hrs.**	
	AVG. WIND SPEED: **2.05 m/s**	DATE: **3/5/2019**	PROJECT NO.: **1003-01.42**

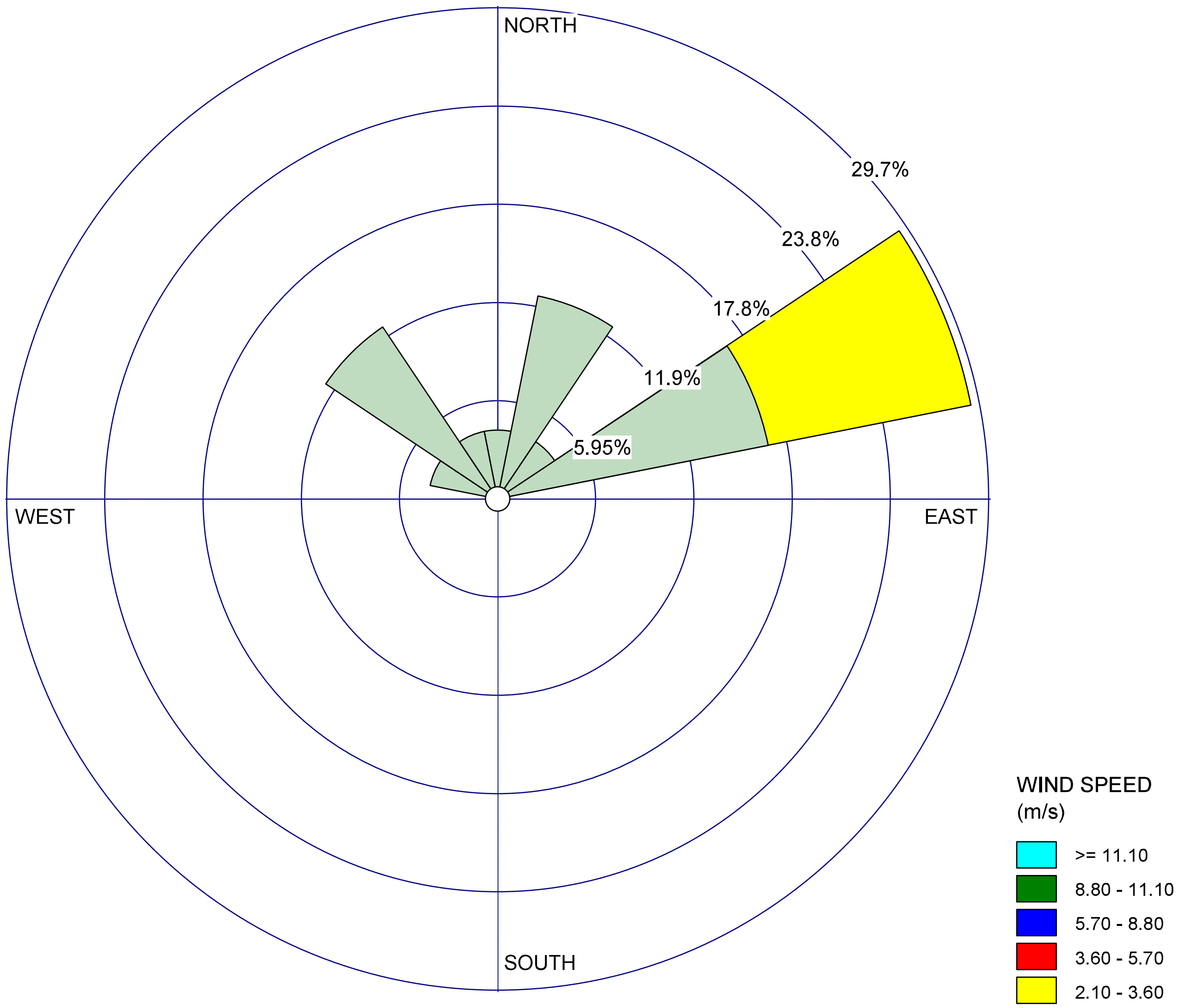
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Baseline 3 - OPG Gate
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 10/2/2018 - 00:00 End Date: 10/3/2018 - 07:00	BCX Environmental Consulting	
		MODELER: **CS**	BCX ENVIRONMENTAL CONSULTING
	CALM WINDS: **25.00%**	TOTAL COUNT: **23 hrs.**	
	AVG. WIND SPEED: **1.13 m/s**	DATE: **3/5/2019**	PROJECT NO.: **1003-01.42**

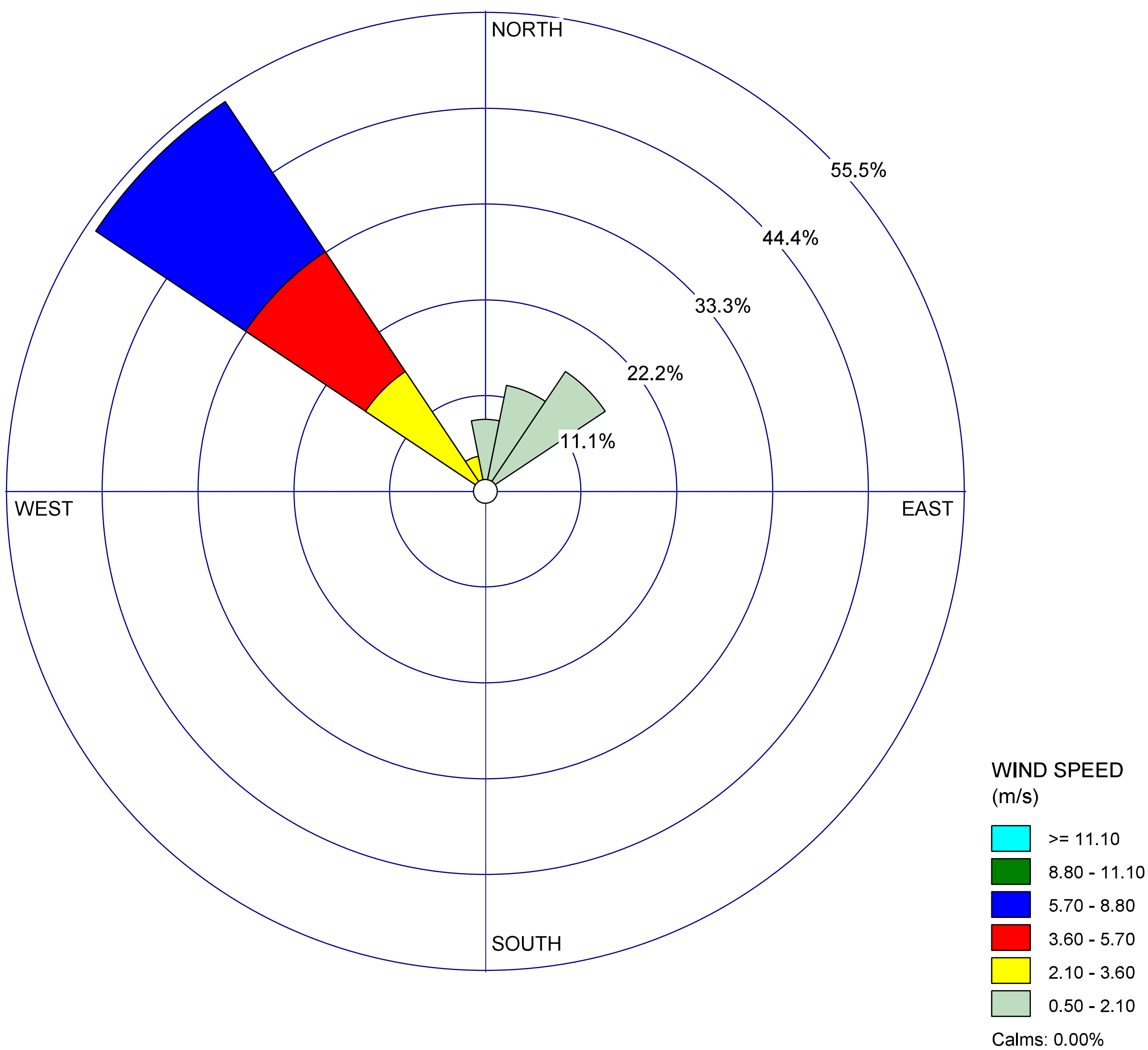
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Alt 2 - OPG Gate
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:

DATA PERIOD:

Start Date: 10/4/2018 - 00:00
End Date: 10/5/2018 - 07:00

COMPANY NAME:

BCX Environmental Consulting

MODELER:

CS

BCX ENVIRONMENTAL CONSULTING

CALM WINDS:

0.00%

TOTAL COUNT:

23 hrs.

AVG. WIND SPEED:

3.30 m/s

DATE:

3/5/2019

PROJECT NO.:

1003-01.42

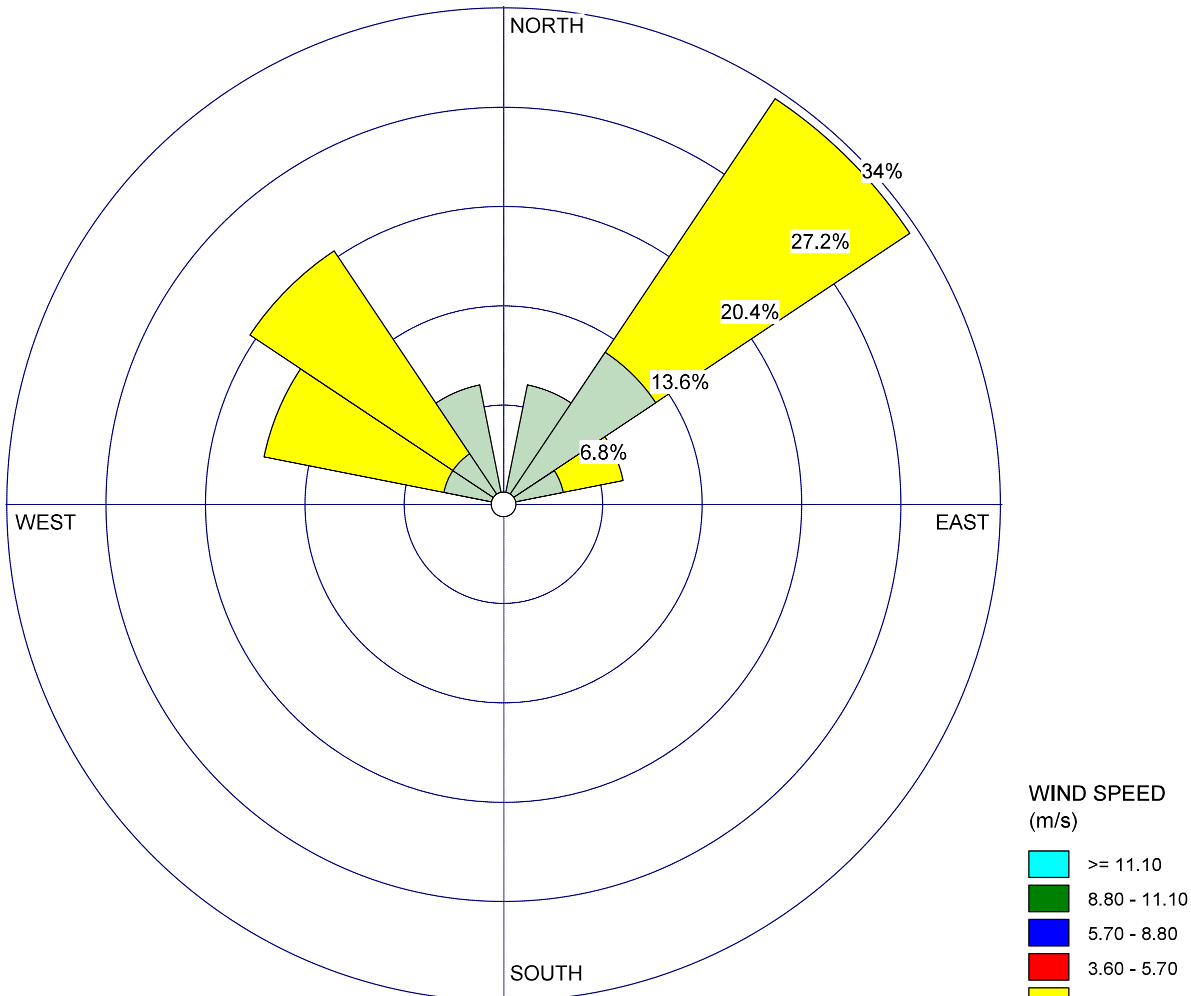
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Alt 2 (4) - OPG Gate
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 12/7/2018 - 00:00 **End Date: 12/8/2018 - 06:00**	**BCX Environmental Consulting**	
		MODELER: **CS**	BCX ENVIRONMENTAL CONSULTING
	CALM WINDS: **0.00%**	TOTAL COUNT: **23 hrs.**	
	AVG. WIND SPEED: **2.08 m/s**	DATE: **3/5/2019**	PROJECT NO.: **1003-01.42**

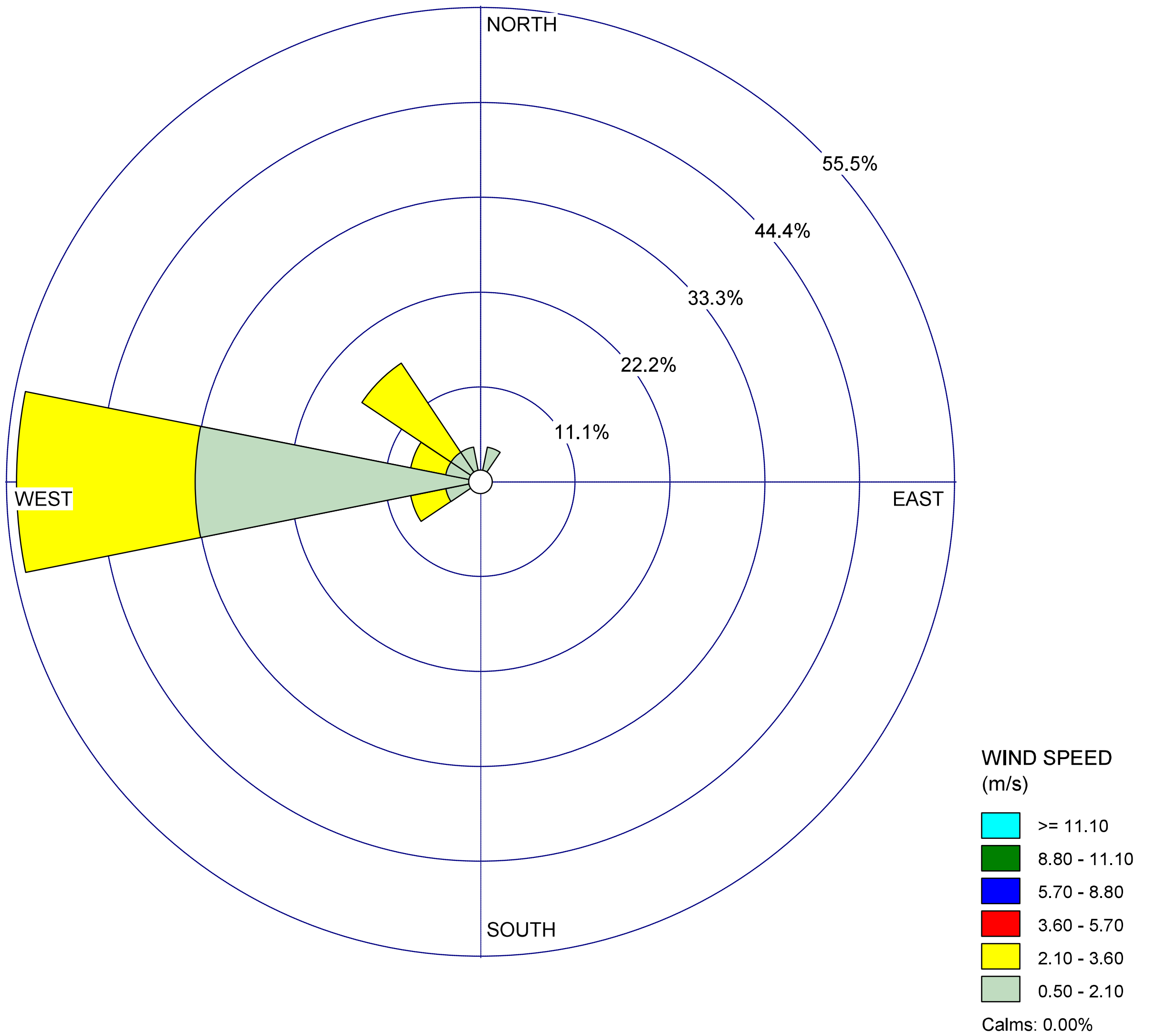
WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

Alt 2 (5) - OPG Gate
Version 16216r

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:

DATA PERIOD:

Start Date: 12/8/2018 - 00:00
End Date: 12/9/2018 - 06:00

COMPANY NAME:

BCX Environmental Consulting

MODELER:

CS

BCX ENVIRONMENTAL CONSULTING

CALM WINDS:

0.00%

TOTAL COUNT:

23 hrs.

AVG. WIND SPEED:

1.94 m/s

DATE:

3/5/2019

PROJECT NO.:

1003-01.42

WRPLOT View - Lakes Environmental Software

APPENDIX C

Table C1: Summary of Sample Flow Rate and Sample Duration for Metals

Sample Date	Condition	OPG			Cove			Beach		
		Filter ID No.	Sample Duration (min)	Sample Volume (m^3)	Filter ID No.	Sample Duration (min)	Sample Volume (m^3)	Filter ID No.	Sample Duration (min)	Sample Volume (m^3)
September 30, 2018	Baseline	Invalid			Invalid			18091348	1361	1598
October 1, 2018	Baseline	18091329	1279	1438	18091329	1426	1630	Invalid		
October 2, 2018	Baseline	18091345	1421	1670	18091343	1434	1698	18091343	1432	1641
October 3, 2018	Alt Fuels	18091334	1428	1656	-	1385	1646	-	1453	1634
October 4, 2018	Baseline	-	1386	1608	-	1342	1584	-	1327	1526
October 10, 2018	Alt Fuels	18091335	1400	1626	18091336	1403	1596	18091337	1406	1560
October 11, 2018	Alt Fuels	18091340	1411	1651	18091941	1408	1629	18091942	1413	1595
October 12, 2018	Alt Fuels	18092701	1430	1714	18092700	1417	1660	18091945	1400	1607
December 4, 2018	Alt Fuels	18111472	1424	1747	18111473	1421	1698	18111474	1421	1770
December 5, 2018	Alt Fuels	18111475	1426	1749	18111476	1420	1701	1811477	1424	1780
December 6, 2018	Alt Fuels	18111478	1352	1675	18111479	1352	1670	18111480	1352	1698
December 7, 2018	Baseline	18111481	1448	1792	1811482	1454	1794	18111483	1450	1776
December 8, 2018	Baseline	18111484	1439	1756	18111485	1423	1754	18111491	1414	1762

Table C2: 2018 OPG Station Monitoring Results for Metals

Contaminant	Units	30-Sep-18	1-Oct-18	2-Oct-18	3-Oct-18	4-Oct-18	10-Oct-18	11-Oct-18	12-Oct-18	4-Dec-18	5-Dec-18	6-Dec-18	7-Dec-18	8-Dec-18
Aluminum (Al)	$\mu g/m^3$	Invalid	0.060	0.030	0.130	0.066	0.572	0.143	0.134	0.132	0.170	0.057	0.108	0.040
Antimony (Sb)	$\mu g/m^3$		0.007	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Arsenic (As)	$\mu g/m^3$		0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.003	0.003	0.004	0.003	0.003
Barium (Ba)	$\mu g/m^3$		0.010	0.007	0.007	0.008	0.016	0.010	0.011	0.021	0.021	0.009	0.011	0.007
Beryllium (Be)	$\mu g/m^3$		0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Boron (B)	$\mu g/m^3$		0.004	0.004	0.004	0.004	0.005	0.004	0.004	0.003	0.003	0.004	0.003	0.003
Cadmium (Cd)	$\mu g/m^3$		0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Calcium (Ca)	$\mu g/m^3$		0.974	0.421	3.189	0.914	16.111	2.592	2.159	3.350	3.402	0.973	1.880	0.718
Chromium (Cr)	$\mu g/m^3$		0.006	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.003	0.003	0.003
Cobalt (Co)	$\mu g/m^3$		0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Copper (Cu)	$\mu g/m^3$		0.030	0.073	0.065	0.054	0.043	0.029	0.048	0.087	0.044	0.034	0.069	0.048
Iron (Fe)	$\mu g/m^3$		0.165	0.120	0.223	0.178	1.082	0.309	0.324	0.479	0.569	0.230	0.269	0.166
Lead (Pb)	$\mu g/m^3$		0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.003	0.002	0.002	0.002
Manganese (Mn)	$\mu g/m^3$		0.004	0.003	0.006	0.005	0.024	0.010	0.010	0.011	0.017	0.006	0.007	0.004
Molybdenum (Mo)	$\mu g/m^3$		0.002	0.004	0.003	0.003	0.003	0.002	0.003	0.005	0.003	0.002	0.003	0.003
Nickel (Ni)	$\mu g/m^3$		0.004	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Phosphorus (P)	$\mu g/m^3$		0.040	0.019	0.033	0.035	0.090	0.096	0.048	0.022	0.023	0.015	0.014	0.014
Potassium (K)	$\mu g/m^3$		0.070	0.060	0.108	0.079	0.398	0.172	0.139	0.067	0.075	0.060	0.056	0.057
Selenium (Se)	$\mu g/m^3$		0.007	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Silver (Ag)	$\mu g/m^3$		0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Strontium (Sr)	$\mu g/m^3$		0.002	0.001	0.006	0.002	0.034	0.004	0.004	0.007	0.007	0.002	0.004	0.003
Thallium (Tl)	$\mu g/m^3$		0.007	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Tin (Sn)	$\mu g/m^3$		0.007	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Titanium (Ti)	$\mu g/m^3$		0.007	0.006	0.006	0.006	0.020	0.007	0.008	0.013	0.013	0.006	0.007	0.006
Vanadium (V)	$\mu g/m^3$		0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Zinc (Zn)	$\mu g/m^3$		0.017	0.023	0.018	0.019	0.030	0.015	0.032	0.031	0.057	0.017	0.021	0.017

NOTE: All non-detectable results

Table C2: 2018 OP(

Contaminant	MECP Criteria (µg/m^3)	No. > Criteria	Geometric Mean	Arithmetic Mean	Minimum Concentration	Maximum Concentration	Number of Valid Samples	% Valid data
Aluminum (Al)	*4.8*	0	0.099	0.137	0.030	0.572	12	92
Antimony (Sb)	*25*	0	0.006	0.006	0.006	0.007	12	92
Arsenic (As)	*0.3*	0	0.004	0.004	0.003	0.004	12	92
Barium (Ba)	*10*	0	0.011	0.012	0.007	0.021	12	92
Beryllium (Be)	*0.01*	0	0.001	0.001	0.001	0.001	12	92
Boron (B)	*120*	0	0.004	0.004	0.003	0.005	12	92
Cadmium (Cd)	*0.025*	0	0.001	0.001	0.001	0.001	12	92
Calcium (Ca)	-	-	1.850	3.057	0.421	16.111	12	92
Chromium (Cr)	*0.5*	0	0.003	0.003	0.003	0.006	12	92
Cobalt (Co)	*0.1*	0	0.001	0.001	0.001	0.001	12	92
Copper (Cu)	*50*	0	0.049	0.052	0.029	0.087	12	92
Iron (Fe)	*4*	0	0.281	0.343	0.120	1.082	12	92
Lead (Pb)	*2*	0	0.002	0.002	0.002	0.003	12	92
Manganese (Mn)	*0.4*	0	0.007	0.009	0.003	0.024	12	92
Molybdenum (Mo)	*120*	0	0.003	0.003	0.002	0.005	12	92
Nickel (Ni)	*0.2*	0	0.002	0.002	0.002	0.004	12	92
Phosphorus (P)	-	-	0.030	0.037	0.014	0.096	12	92
Potassium (K)	-	-	0.091	0.112	0.056	0.398	12	92
Selenium (Se)	*10*	0	0.006	0.006	0.006	0.007	12	92
Silver (Ag)	*1*	0	0.003	0.003	0.003	0.003	12	92
Strontium (Sr)	*120*	0	0.004	0.006	0.001	0.034	12	92
Thallium (Tl)	-	-	0.006	0.006	0.006	0.007	12	92
Tin (Sn)	*10*	0	0.006	0.006	0.006	0.007	12	92
Titanium (Ti)	*120*	0	0.008	0.009	0.006	0.020	12	92
Vanadium (V)	*2*	0	0.003	0.003	0.003	0.003	12	92
Zinc (Zn)	*120*	0	0.023	0.025	0.015	0.057	12	92

Table C3: 2018 Cove Station Monitoring Results for Metals

Contaminant	Units	30-Sep-18	1-Oct-18	2-Oct-18	3-Oct-18	4-Oct-18	10-Oct-18	11-Oct-18	12-Oct-18	4-Dec-18	5-Dec-18	6-Dec-18	7-Dec-18	8-Dec-18
Aluminum (Al)	$\mu g/m^3$	Invalid	0.057	0.029	0.046	0.052	0.096	0.180	0.151	0.106	0.237	0.190	0.041	0.031
Antimony (Sb)	$\mu g/m^3$		0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Arsenic (As)	$\mu g/m^3$		0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.003	0.003
Barium (Ba)	$\mu g/m^3$		0.004	0.004	0.004	0.004	0.007	0.006	0.006	0.014	0.015	0.007	0.004	0.005
Beryllium (Be)	$\mu g/m^3$		0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Boron (B)	$\mu g/m^3$		0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.003	0.003
Cadmium (Cd)	$\mu g/m^3$		0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Calcium (Ca)	$\mu g/m^3$		0.767	0.442	0.948	1.124	1.566	5.975	4.403	3.434	6.350	5.364	0.942	0.667
Chromium (Cr)	$\mu g/m^3$		0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Cobalt (Co)	$\mu g/m^3$		0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Copper (Cu)	$\mu g/m^3$		0.069	0.101	0.099	0.055	0.107	0.035	0.053	0.052	0.037	0.019	0.010	0.012
Iron (Fe)	$\mu g/m^3$		0.178	0.113	0.120	0.128	0.231	0.406	0.335	0.370	0.587	0.374	0.139	0.130
Lead (Pb)	$\mu g/m^3$		0.002	0.002	0.002	0.002	0.004	0.002	0.002	0.002	0.004	0.002	0.002	0.002
Manganese (Mn)	$\mu g/m^3$		0.007	0.005	0.004	0.005	0.008	0.011	0.010	0.009	0.017	0.009	0.004	0.003
Molybdenum (Mo)	$\mu g/m^3$		0.002	0.003	0.003	0.002	0.004	0.002	0.003	0.003	0.002	0.002	0.002	0.002
Nickel (Ni)	$\mu g/m^3$		0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Phosphorus (P)	$\mu g/m^3$		0.017	0.021	0.019	0.027	0.038	0.063	0.025	0.015	0.020	0.016	0.014	0.014
Potassium (K)	$\mu g/m^3$		0.061	0.059	0.061	0.076	0.105	0.179	0.113	0.069	0.182	0.141	0.056	0.057
Selenium (Se)	$\mu g/m^3$		0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Silver (Ag)	$\mu g/m^3$		0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Strontium (Sr)	$\mu g/m^3$		0.001	0.001	0.002	0.002	0.003	0.011	0.008	0.006	0.012	0.010	0.002	0.002
Thallium (Tl)	$\mu g/m^3$		0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Tin (Sn)	$\mu g/m^3$		0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Titanium (Ti)	$\mu g/m^3$		0.006	0.006	0.006	0.006	0.006	0.007	0.007	0.007	0.012	0.008	0.006	0.006
Vanadium (V)	$\mu g/m^3$		0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Zinc (Zn)	$\mu g/m^3$		0.013	0.021	0.016	0.014	0.018	0.012	0.020	0.016	0.047	0.015	0.009	0.011

NOTE: All non-detectable results

Table C3: 2018 Cov

Contaminant	MECP Criteria (µg/m^3)	No. > Criteria	Geometric Mean	Arithmetic Mean	Minimum Concentration	Maximum Concentration	Number of Valid Samples	% Valid data
Aluminum (Al)	*4.8*	0	0.079	0.101	0.029	0.237	12	92
Antimony (Sb)	*25*	0	0.006	0.006	0.006	0.006	12	92
Arsenic (As)	*0.3*	0	0.004	0.004	0.003	0.004	12	92
Barium (Ba)	*10*	0	0.006	0.007	0.004	0.015	12	92
Beryllium (Be)	*0.01*	0	0.001	0.001	0.001	0.001	12	92
Boron (B)	*120*	0	0.004	0.004	0.003	0.004	12	92
Cadmium (Cd)	*0.025*	0	0.001	0.001	0.001	0.001	12	92
Calcium (Ca)	-	-	1.792	2.665	0.442	6.350	12	92
Chromium (Cr)	*0.5*	0	0.003	0.003	0.003	0.003	12	92
Cobalt (Co)	*0.1*	0	0.001	0.001	0.001	0.001	12	92
Copper (Cu)	*50*	0	0.042	0.054	0.010	0.107	12	92
Iron (Fe)	*4*	0	0.222	0.259	0.113	0.587	12	92
Lead (Pb)	*2*	0	0.002	0.002	0.002	0.004	12	92
Manganese (Mn)	*0.4*	0	0.007	0.008	0.003	0.017	12	92
Molybdenum (Mo)	*120*	0	0.002	0.002	0.002	0.004	12	92
Nickel (Ni)	*0.2*	0	0.002	0.002	0.002	0.002	12	92
Phosphorus (P)	-	-	0.022	0.024	0.014	0.063	12	92
Potassium (K)	-	-	0.087	0.097	0.056	0.182	12	92
Selenium (Se)	*10*	0	0.006	0.006	0.006	0.006	12	92
Silver (Ag)	*1*	0	0.003	0.003	0.003	0.003	12	92
Strontium (Sr)	*120*	0	0.003	0.005	0.001	0.012	12	92
Thallium (Tl)	-	-	0.006	0.006	0.006	0.006	12	92
Tin (Sn)	*10*	0	0.006	0.006	0.006	0.006	12	92
Titanium (Ti)	*120*	0	0.007	0.007	0.006	0.012	12	92
Vanadium (V)	*2*	0	0.003	0.003	0.003	0.003	12	92
Zinc (Zn)	*120*	0	0.016	0.018	0.009	0.047	12	92

Table C4: 2018 Beach Station Monitoring Results for Metals

Contaminant	Units	30-Sep-18	1-Oct-18	2-Oct-18	3-Oct-18	4-Oct-18	10-Oct-18	11-Oct-18	12-Oct-18	4-Dec-18	5-Dec-18	6-Dec-18	7-Dec-18	8-Dec-18
Aluminum (Al)	µg/m^3	0.076	Invalid	0.051	0.043	0.147	0.094	0.442	0.394	0.361	0.490	0.241	0.193	0.229
Antimony (Sb)	µg/m^3	0.006		0.006	0.006	0.007	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Arsenic (As)	µg/m^3	0.004		0.004	0.004	0.004	0.004	0.004	0.004	0.003	0.003	0.004	0.003	0.003
Barium (Ba)	µg/m^3	0.007		0.003	0.007	0.004	0.006	0.008	0.007	0.015	0.017	0.009	0.005	0.006
Beryllium (Be)	µg/m^3	0.001		0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Boron (B)	µg/m^3	0.004		0.004	0.004	0.004	0.004	0.004	0.004	0.003	0.003	0.004	0.003	0.003
Cadmium (Cd)	µg/m^3	0.001		0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Calcium (Ca)	µg/m^3	1.759		1.743	0.850	5.079	1.916	12.414	9.956	14.410	13.930	6.714	6.756	5.169
Chromium (Cr)	µg/m^3	0.003		0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Cobalt (Co)	µg/m^3	0.001		0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Copper (Cu)	µg/m^3	0.109		0.112	0.073	0.040	0.050	0.015	0.016	0.046	0.018	0.011	0.026	0.014
Iron (Fe)	µg/m^3	0.208		0.118	0.124	0.279	0.222	0.777	0.597	0.740	0.916	0.388	0.375	0.318
Lead (Pb)	µg/m^3	0.003		0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.004	0.004	0.002	0.002
Manganese (Mn)	µg/m^3	0.009		0.003	0.004	0.009	0.008	0.019	0.017	0.019	0.023	0.010	0.009	0.008
Molybdenum (Mo)	µg/m^3	0.005		0.005	0.003	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002
Nickel (Ni)	µg/m^3	0.002		0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Phosphorus (P)	µg/m^3	0.019		0.019	0.022	0.033	0.038	0.075	0.038	0.029	0.033	0.017	0.016	0.014
Potassium (K)	µg/m^3	0.105		0.066	0.061	0.120	0.103	0.397	0.311	0.197	0.473	0.373	0.107	0.214
Selenium (Se)	µg/m^3	0.006		0.006	0.006	0.007	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Silver (Ag)	µg/m^3	0.003		0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Strontium (Sr)	µg/m^3	0.004		0.003	0.002	0.010	0.004	0.024	0.019	0.026	0.026	0.013	0.013	0.010
Thallium (Tl)	µg/m^3	0.006		0.006	0.006	0.007	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Tin (Sn)	µg/m^3	0.006		0.006	0.006	0.007	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Titanium (Ti)	µg/m^3	0.006		0.006	0.006	0.007	0.006	0.021	0.017	0.010	0.019	0.009	0.006	0.012
Vanadium (V)	µg/m^3	0.003		0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Zinc (Zn)	µg/m^3	0.054		0.014	0.021	0.011	0.016	0.018	0.030	0.018	0.040	0.016	0.009	0.013

NOTE: All non-detectable results

Table C4: 2018 Bea

Contaminant	MECP Criteria (µg/m^3)	No. > Criteria	Geometric Mean	Arithmetic Mean	Minimum Concentration	Maximum Concentration	Number of Valid Samples	% Valid data
Aluminum (Al)	*4.8*	0	0.174	0.230	0.043	0.490	12	92
Antimony (Sb)	*25*	0	0.006	0.006	0.006	0.007	12	92
Arsenic (As)	*0.3*	0	0.004	0.004	0.003	0.004	12	92
Barium (Ba)	*10*	0	0.007	0.008	0.003	0.017	12	92
Beryllium (Be)	*0.01*	0	0.001	0.001	0.001	0.001	12	92
Boron (B)	*120*	0	0.004	0.004	0.003	0.004	12	92
Cadmium (Cd)	*0.025*	0	0.001	0.001	0.001	0.001	12	92
Calcium (Ca)	-	-	4.795	6.725	0.850	14.410	12	92
Chromium (Cr)	*0.5*	0	0.003	0.003	0.003	0.003	12	92
Cobalt (Co)	*0.1*	0	0.001	0.001	0.001	0.001	12	92
Copper (Cu)	*50*	0	0.032	0.044	0.011	0.112	12	92
Iron (Fe)	*4*	0	0.344	0.422	0.118	0.916	12	92
Lead (Pb)	*2*	0	0.002	0.002	0.002	0.004	12	92
Manganese (Mn)	*0.4*	0	0.010	0.011	0.003	0.023	12	92
Molybdenum (Mo)	*120*	0	0.002	0.002	0.002	0.005	12	92
Nickel (Ni)	*0.2*	0	0.002	0.002	0.002	0.002	12	92
Phosphorus (P)	-	-	0.026	0.029	0.014	0.075	12	92
Potassium (K)	-	-	0.168	0.211	0.061	0.473	12	92
Selenium (Se)	*10*	0	0.006	0.006	0.006	0.007	12	92
Silver (Ag)	*1*	0	0.003	0.003	0.003	0.003	12	92
Strontium (Sr)	*120*	0	0.009	0.013	0.002	0.026	12	92
Thallium (Tl)	-	-	0.006	0.006	0.006	0.007	12	92
Tin (Sn)	*10*	0	0.006	0.006	0.006	0.007	12	92
Titanium (Ti)	*120*	0	0.009	0.010	0.006	0.021	12	92
Vanadium (V)	*2*	0	0.003	0.003	0.003	0.003	12	92
Zinc (Zn)	*120*	0	0.019	0.022	0.009	0.054	12	92

Table C5: 2018 Monitoring Results Comparison for Metals

		Baseline											
		30-Sep-18			1-Oct-18			2-Oct-18			4-Oct-18		
		OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
Contaminant	Units	Background	Background	Background	Background	Background	Background	Background	Background	Background	Upwind	Background	Background
Aluminum (Al)	µg/m³	Invalid	Invalid	0.076	0.060	0.057	Invalid	0.030	0.029	0.051	0.066	0.052	0.147
Antimony (Sb)	µg/m³			0.006	0.007	0.006		0.006	0.006	0.006	0.006	0.006	0.007
Arsenic (As)	µg/m³			0.004	0.004	0.004		0.004	0.004	0.004	0.004	0.004	0.004
Barium (Ba)	µg/m³			0.007	0.010	0.004		0.007	0.004	0.003	0.008	0.004	0.004
Beryllium (Be)	µg/m³			0.001	0.001	0.001		0.001	0.001	0.001	0.001	0.001	0.001
Boron (B)	µg/m³			0.004	0.004	0.004		0.004	0.004	0.004	0.004	0.004	0.004
Cadmium (Cd)	µg/m³			0.001	0.001	0.001		0.001	0.001	0.001	0.001	0.001	0.001
Calcium (Ca)	µg/m³			1.759	0.974	0.767		0.421	0.442	1.743	0.914	1.124	5.079
Chromium (Cr)	µg/m³			0.003	0.006	0.003		0.003	0.003	0.003	0.003	0.003	0.003
Cobalt (Co)	µg/m³			0.001	0.001	0.001		0.001	0.001	0.001	0.001	0.001	0.001
Copper (Cu)	µg/m³			0.109	0.030	0.069		0.073	0.101	0.112	0.054	0.055	0.040
Iron (Fe)	µg/m³			0.208	0.165	0.178		0.120	0.113	0.118	0.178	0.128	0.279
Lead (Pb)	µg/m³			0.003	0.002	0.002		0.002	0.002	0.002	0.002	0.002	0.002
Manganese (Mn)	µg/m³			0.009	0.004	0.007		0.003	0.005	0.003	0.005	0.005	0.009
Molybdenum (Mo)	µg/m³			0.005	0.002	0.002		0.004	0.003	0.005	0.003	0.002	0.002
Nickel (Ni)	µg/m³			0.002	0.004	0.002		0.002	0.002	0.002	0.002	0.002	0.002
Phosphorus (P)	µg/m³			0.019	0.040	0.017		0.019	0.021	0.019	0.035	0.027	0.033
Potassium (K)	µg/m³			0.105	0.070	0.061		0.060	0.059	0.066	0.079	0.076	0.120
Selenium (Se)	µg/m³			0.006	0.007	0.006		0.006	0.006	0.006	0.006	0.006	0.007
Silver (Ag)	µg/m³			0.003	0.003	0.003		0.003	0.003	0.003	0.003	0.003	0.003
Strontium (Sr)	µg/m³			0.004	0.002	0.001		0.001	0.001	0.003	0.002	0.002	0.010
Thallium (Tl)	µg/m³			0.006	0.007	0.006		0.006	0.006	0.006	0.006	0.006	0.007
Tin (Sn)	µg/m³			0.006	0.007	0.006		0.006	0.006	0.006	0.006	0.006	0.007
Titanium (Ti)	µg/m³			0.006	0.007	0.006		0.006	0.006	0.006	0.006	0.006	0.007
Vanadium (V)	µg/m³			0.003	0.003	0.003		0.003	0.003	0.003	0.003	0.003	0.003
Zinc (Zn)	µg/m³			0.054	0.017	0.013		0.023	0.021	0.014	0.019	0.014	0.011

Table C5: 2018 Monitoring Res

Contaminant	Units	Alt Fuel											
		3-Oct-18			10-Oct-18			11-Oct-18			12-Oct-18		
		OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
Contaminant	Units	Downwind	Background	Upwind	Background	Background	Background	Upwind	Downwind	Upwind	Upwind	Downwind	Downwind
Aluminum (Al)	μg/m^3	0.130	0.046	0.043	0.572	0.096	0.094	0.143	0.180	0.442	0.134	0.151	0.394
Antimony (Sb)	μg/m^3	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Arsenic (As)	μg/m^3	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
Barium (Ba)	μg/m^3	0.007	0.004	0.007	0.016	0.007	0.006	0.010	0.006	0.008	0.011	0.006	0.007
Beryllium (Be)	μg/m^3	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Boron (B)	μg/m^3	0.004	0.004	0.004	0.005	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
Cadmium (Cd)	μg/m^3	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Calcium (Ca)	μg/m^3	3.189	0.948	0.850	16.111	1.566	1.916	2.592	5.975	12.414	2.159	4.403	9.956
Chromium (Cr)	μg/m^3	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Cobalt (Co)	μg/m^3	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Copper (Cu)	μg/m^3	0.065	0.099	0.073	0.043	0.107	0.050	0.029	0.035	0.015	0.048	0.053	0.016
Iron (Fe)	μg/m^3	0.223	0.120	0.124	1.082	0.231	0.222	0.309	0.406	0.777	0.324	0.335	0.597
Lead (Pb)	μg/m^3	0.002	0.002	0.002	0.003	0.004	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Manganese (Mn)	μg/m^3	0.006	0.004	0.004	0.024	0.008	0.008	0.010	0.011	0.019	0.010	0.010	0.017
Molybdenum (Mo)	μg/m^3	0.003	0.003	0.003	0.003	0.004	0.002	0.002	0.002	0.002	0.003	0.003	0.002
Nickel (Ni)	μg/m^3	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Phosphorus (P)	μg/m^3	0.033	0.019	0.022	0.090	0.038	0.038	0.096	0.063	0.075	0.048	0.025	0.038
Potassium (K)	μg/m^3	0.108	0.061	0.061	0.398	0.105	0.103	0.172	0.179	0.397	0.139	0.113	0.311
Selenium (Se)	μg/m^3	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Silver (Ag)	μg/m^3	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Strontium (Sr)	μg/m^3	0.006	0.002	0.002	0.034	0.003	0.004	0.004	0.011	0.024	0.004	0.008	0.019
Thallium (Tl)	μg/m^3	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Tin (Sn)	μg/m^3	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Titanium (Ti)	μg/m^3	0.006	0.006	0.006	0.020	0.006	0.006	0.007	0.007	0.021	0.008	0.007	0.017
Vanadium (V)	μg/m^3	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Zinc (Zn)	μg/m^3	0.018	0.016	0.021	0.030	0.018	0.016	0.015	0.012	0.018	0.032	0.020	0.030

Table C5: 2018 Monitoring Res

		Alt Fuel									Baseline					
		4-Dec-18			5-Dec-18			6-Dec-18			7-Dec-18			8-Dec-18		
		OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
Contaminant	Units	Uwind	Background	Downwind	Background	Background	Background	Upwind	Background	Downwind	Background	Upwind	Background	Background	Background	Background
Aluminum (Al)	µg/m^3	0.132	0.106	0.361	0.170	0.237	0.490	0.057	0.190	0.241	0.108	0.041	0.193	0.040	0.031	0.229
Antimony (Sb)	µg/m^3	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Arsenic (As)	µg/m^3	0.003	0.004	0.003	0.003	0.004	0.003	0.004	0.004	0.004	0.003	0.003	0.003	0.003	0.003	0.003
Barium (Ba)	µg/m^3	0.021	0.014	0.015	0.021	0.015	0.017	0.009	0.007	0.009	0.011	0.004	0.005	0.007	0.005	0.006
Beryllium (Be)	µg/m^3	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Boron (B)	µg/m^3	0.003	0.004	0.003	0.003	0.004	0.003	0.004	0.004	0.004	0.003	0.003	0.003	0.003	0.003	0.003
Cadmium (Cd)	µg/m^3	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Calcium (Ca)	µg/m^3	3.350	3.434	14.410	3.402	6.350	13.930	0.973	5.364	6.714	1.880	0.942	6.756	0.718	0.667	5.169
Chromium (Cr)	µg/m^3	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Cobalt (Co)	µg/m^3	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Copper (Cu)	µg/m^3	0.087	0.052	0.046	0.044	0.037	0.018	0.034	0.019	0.011	0.069	0.010	0.026	0.048	0.012	0.014
Iron (Fe)	µg/m^3	0.479	0.370	0.740	0.569	0.587	0.916	0.230	0.374	0.388	0.269	0.139	0.375	0.166	0.130	0.318
Lead (Pb)	µg/m^3	0.002	0.002	0.002	0.003	0.004	0.004	0.002	0.002	0.004	0.002	0.002	0.002	0.002	0.002	0.002
Manganese (Mn)	µg/m^3	0.011	0.009	0.019	0.017	0.017	0.023	0.006	0.009	0.010	0.007	0.004	0.009	0.004	0.003	0.008
Molybdenum (Mo)	µg/m^3	0.005	0.003	0.003	0.003	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.003	0.002	0.002
Nickel (Ni)	µg/m^3	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Phosphorus (P)	µg/m^3	0.022	0.015	0.029	0.023	0.020	0.033	0.015	0.016	0.017	0.014	0.014	0.016	0.014	0.014	0.014
Potassium (K)	µg/m^3	0.067	0.069	0.197	0.075	0.182	0.473	0.060	0.141	0.373	0.056	0.056	0.107	0.057	0.057	0.214
Selenium (Se)	µg/m^3	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Silver (Ag)	µg/m^3	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Strontium (Sr)	µg/m^3	0.007	0.006	0.026	0.007	0.012	0.026	0.002	0.010	0.013	0.004	0.002	0.013	0.003	0.002	0.010
Thallium (Tl)	µg/m^3	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Tin (Sn)	µg/m^3	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Titanium (Ti)	µg/m^3	0.013	0.007	0.010	0.013	0.012	0.019	0.006	0.008	0.009	0.007	0.006	0.006	0.006	0.006	0.012
Vanadium (V)	µg/m^3	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Zinc (Zn)	µg/m^3	0.031	0.016	0.018	0.057	0.047	0.040	0.017	0.015	0.016	0.021	0.009	0.009	0.017	0.011	0.013

APPENDIX D

Table D1: Summary of Sample Flow Rate and Sample Duration for D&Fs

Sample Date	OPG			Cove			Beach		
	Media ID No.	Sample Duration (min)	Sample Volume (m^3)	Media ID No.	Sample Duration (min)	Sample Volume (m^3)	Media ID No.	Sample Duration (min)	Sample Volume (m^3)
September 30, 2018	Invalid			#17	1339	304	#6	1358	312
October 1, 2018	#9	1291	287	#11	1385	317	Invalid		
October 2, 2018	#5	1424	316	#10	1433	328	#7	1432	320
October 3, 2018	#2	1428	314	#20	1385	317	#16	1454	323
October 4, 2018	#18	1386	301	#17	1343	313	#19	1327	292
October 10, 2018	#12	1400	306	#13	1404	314	#15	1408	307
October 11, 2018	#14	1411	309	#4	1408	319	#2	1414	315
October 12, 2018	#3	1429	317	#5	1418	326	#1	1401	316
December 4, 2018	#8	1387	301	#9	1420	314	#4	1421	292
December 5, 2018	#13	1424	307	#6	1423	313	#18	1424	293
December 6, 2018	#17	1352	294	#21	1354	299	-	1352	279
December 7, 2018	#12	1448	317	#1	1454	323	#11	1450	302
December 8, 2018	#20	1438	313	#14	1424	316	#10	1414	293

Table D2: 2018 OPG Station Monitoring Results for D&F

Contaminant	Units	30-Sep-18	1-Oct-18	2-Oct-18	3-Oct-18	4-Oct-18	10-Oct-18	11-Oct-18	12-Oct-18	4-Dec-18	5-Dec-18	6-Dec-18	7-Dec-18	8-Dec-18
2,3,7,8-TCDD	pg/m^3	Invalid	0.0136	0.0114	0.0111	0.0136	0.0121	0.0081	0.0079	0.0110	0.0098	0.0214	0.0114	0.0096
1,2,3,7,8-PeCDD	pg/m^3		0.0139	0.0108	0.0115	0.0110	0.0111	0.0104	0.0085	0.0106	0.0111	0.0119	0.0098	0.0102
1,2,3,4,7,8-HxCDD	pg/m^3		0.0136	0.0130	0.0137	0.0136	0.0111	0.0107	0.0101	0.0130	0.0114	0.0116	0.0110	0.0105
1,2,3,6,7,8-HxCDD	pg/m^3		0.0132	0.0127	0.0134	0.0133	0.0114	0.0107	0.0098	0.0233	0.0101	0.0133	0.0132	0.0109
1,2,3,7,8,9-HxCDD	pg/m^3		0.0132	0.0127	0.0134	0.0133	0.0108	0.0104	0.0098	0.0249	0.0101	0.0102	0.0177	0.0099
1,2,3,4,6,7,8-HpCDD	pg/m^3		0.0216	0.0361	0.0328	0.0123	0.0170	0.0110	0.0489	0.2701	0.0668	0.1551	0.1199	0.0473
OCDD	pg/m^3		0.0561	0.1206	0.1022	0.0385	0.0654	0.0589	0.1401	0.5216	0.1671	0.3673	0.2366	0.1502
2,3,7,8-TCDF	pg/m^3		0.0153	0.0114	0.0134	0.0143	0.0098	0.0100	0.0085	0.0183	0.0117	0.0119	0.0107	0.0131
1,2,3,7,8-PeCDF	pg/m^3		0.0146	0.0123	0.0140	0.0136	0.0124	0.0100	0.0088	0.0100	0.0098	0.0116	0.0114	0.0109
2,3,4,7,8-PeCDF	pg/m^3		0.0146	0.0127	0.0143	0.0140	0.0127	0.0104	0.0088	0.0100	0.0101	0.0119	0.0110	0.0109
1,2,3,4,7,8-HxCDF	pg/m^3		0.0129	0.0114	0.0102	0.0113	0.0092	0.0091	0.0095	0.0100	0.0098	0.0105	0.0098	0.0099
1,2,3,6,7,8-HxCDF	pg/m^3		0.0122	0.0111	0.0099	0.0110	0.0092	0.0091	0.0095	0.0090	0.0088	0.0095	0.0095	0.0099
2,3,4,6,7,8-HxCDF	pg/m^3		0.0143	0.0130	0.0115	0.0126	0.0098	0.0104	0.0107	0.0106	0.0104	0.0116	0.0101	0.0105
1,2,3,7,8,9-HxCDF	pg/m^3		0.0164	0.0149	0.0131	0.0143	0.0111	0.0120	0.0123	0.0120	0.0121	0.0129	0.0110	0.0115
1,2,3,4,6,7,8-HpCDF	pg/m^3		0.0115	0.0092	0.0092	0.0090	0.0095	0.0061	0.0085	0.0093	0.0124	0.0095	0.0101	0.0089
1,2,3,4,7,8,9-HpCDF	pg/m^3		0.0167	0.0133	0.0134	0.0130	0.0127	0.0091	0.0120	0.0123	0.0124	0.0133	0.0110	0.0109
OCDF	pg/m^3		0.0132	0.0133	0.0102	0.0146	0.0225	0.0087	0.0101	0.0153	0.0114	0.0156	0.0126	0.0112
Total Toxic Equivalency	pg TEQ/m^3		0.0439	0.0370	0.0379	0.0399	0.0359	0.0304	0.0281	0.0402	0.0336	0.0483	0.0356	0.0326

NOTE: Greyed out cells indicate non-detectable results

Table D2: 2018 OPG Sta

Contaminant	MECP Criteria (µg/m^3)	No. > Criteria	Arithmetic Mean	Minimum Concentration	Maximum Concentration	Number of Valid Samples	% Valid data
2,3,7,8-TCDD	-	-	0.0117	0.0079	0.0214	12	92
1,2,3,7,8-PeCDD	-	-	0.0109	0.0085	0.0139	12	92
1,2,3,4,7,8-HxCDD	-	-	0.0119	0.0101	0.0137	12	92
1,2,3,6,7,8-HxCDD	-	-	0.0129	0.0098	0.0233	12	92
1,2,3,7,8,9-HxCDD	-	-	0.0130	0.0098	0.0249	12	92
1,2,3,4,6,7,8-HpCDD	-	-	0.0699	0.0110	0.2701	12	92
OCDD	-	-	0.1687	0.0385	0.5216	12	92
2,3,7,8-TCDF	-	-	0.0124	0.0085	0.0183	12	92
1,2,3,7,8-PeCDF	-	-	0.0116	0.0088	0.0146	12	92
2,3,4,7,8-PeCDF	-	-	0.0118	0.0088	0.0146	12	92
1,2,3,4,7,8-HxCDF	-	-	0.0103	0.0091	0.0129	12	92
1,2,3,6,7,8-HxCDF	-	-	0.0099	0.0088	0.0122	12	92
2,3,4,6,7,8-HxCDF	-	-	0.0113	0.0098	0.0143	12	92
1,2,3,7,8,9-HxCDF	-	-	0.0128	0.0110	0.0164	12	92
1,2,3,4,6,7,8-HpCDF	-	-	0.0094	0.0061	0.0124	12	92
1,2,3,4,7,8,9-HpCDF	-	-	0.0125	0.0091	0.0167	12	92
OCDF	-	-	0.0132	0.0087	0.0225	12	92
Total Toxic Equivalency	0.1	0	0.0369	0.0281	0.0483	12	92

Table D3: 2018 Cove Station Monitoring Results for D&F

Contaminant	Units	30-Sep-18	1-Oct-18	2-Oct-18	3-Oct-18	4-Oct-18	10-Oct-18	11-Oct-18	12-Oct-18	4-Dec-18	5-Dec-18	6-Dec-18	7-Dec-18	8-Dec-18
2,3,7,8-TCDD	pg/m^3	0.0138	0.0129	0.0128	0.0101	0.0105	0.0108	0.0094	0.0098	0.0108	0.0096	0.0110	0.0099	0.0098
1,2,3,7,8-PeCDD	pg/m^3	0.0141	0.0110	0.0110	0.0123	0.0121	0.0115	0.0094	0.0098	0.0111	0.0099	0.0110	0.0105	0.0104
1,2,3,4,7,8-HxCDD	pg/m^3	0.0151	0.0142	0.0128	0.0126	0.0144	0.0105	0.0088	0.0107	0.0143	0.0125	0.0110	0.0099	0.0111
1,2,3,6,7,8-HxCDD	pg/m^3	0.0148	0.0139	0.0125	0.0123	0.0141	0.0108	0.0088	0.0104	0.0357	0.0109	0.0097	0.0155	0.0111
1,2,3,7,8,9-HxCDD	pg/m^3	0.0145	0.0136	0.0125	0.0123	0.0141	0.0102	0.0085	0.0104	0.0538	0.0109	0.0120	0.0204	0.0101
1,2,3,4,6,7,8-HpCDD	pg/m^3	0.0664	0.0132	0.0421	0.0278	0.0131	0.0178	0.0119	0.0325	0.4013	0.0655	0.0692	0.1276	0.0544
OCDD	pg/m^3	0.1914	0.0375	0.1625	0.1013	0.0272	0.0608	0.0495	0.0837	0.6847	0.1565	0.2003	0.2960	0.1718
2,3,7,8-TCDF	pg/m^3	0.0141	0.0123	0.0128	0.0132	0.0128	0.0111	0.0091	0.0104	0.0153	0.0131	0.0114	0.0099	0.0098
1,2,3,7,8-PeCDF	pg/m^3	0.0122	0.0139	0.0122	0.0136	0.0134	0.0105	0.0094	0.0104	0.0099	0.0099	0.0100	0.0099	0.0101
2,3,4,7,8-PeCDF	pg/m^3	0.0122	0.0142	0.0125	0.0139	0.0137	0.0105	0.0094	0.0107	0.0099	0.0099	0.0104	0.0099	0.0101
1,2,3,4,7,8-HxCDF	pg/m^3	0.0105	0.0120	0.0098	0.0104	0.0109	0.0096	0.0091	0.0086	0.0096	0.0105	0.0104	0.0093	0.0098
1,2,3,6,7,8-HxCDF	pg/m^3	0.0102	0.0117	0.0095	0.0101	0.0105	0.0099	0.0088	0.0083	0.0086	0.0096	0.0094	0.0093	0.0095
2,3,4,6,7,8-HxCDF	pg/m^3	0.0118	0.0136	0.0110	0.0117	0.0125	0.0105	0.0100	0.0098	0.0102	0.0115	0.0114	0.0099	0.0101
1,2,3,7,8,9-HxCDF	pg/m^3	0.0138	0.0155	0.0125	0.0132	0.0141	0.0118	0.0116	0.0110	0.0118	0.0128	0.0127	0.0108	0.0111
1,2,3,4,6,7,8-HpCDF	pg/m^3	0.0115	0.0117	0.0095	0.0082	0.0080	0.0099	0.0075	0.0083	0.0172	0.0086	0.0087	0.0090	0.0089
1,2,3,4,7,8,9-HpCDF	pg/m^3	0.0168	0.0167	0.0134	0.0117	0.0115	0.0131	0.0110	0.0120	0.0118	0.0121	0.0120	0.0111	0.0108
OCDF	pg/m^3	0.0115	0.0205	0.0125	0.0136	0.0144	0.0197	0.0097	0.0190	0.0175	0.0112	0.0110	0.0139	0.0108
Total Toxic Equivalency	pg TEQ/m^3	0.0434	0.0397	0.0378	0.0372	0.0380	0.0347	0.0297	0.0316	0.0455	0.0329	0.0351	0.0347	0.0326

NOTE: Greyed out cells indicate non-detectable results

Table D3: 2018 Cove Sta

Contaminant	MECP Criteria (µg/m^3)	No. > Criteria	Arithmetic Mean	Minimum Concentration	Maximum Concentration	Number of Valid Samples	% Valid data
2,3,7,8-TCDD	-	-	0.0109	0.0094	0.0138	13	100
1,2,3,7,8-PeCDD	-	-	0.0111	0.0094	0.0141	13	100
1,2,3,4,7,8-HxCDD	-	-	0.0122	0.0088	0.0151	13	100
1,2,3,6,7,8-HxCDD	-	-	0.0139	0.0088	0.0357	13	100
1,2,3,7,8,9-HxCDD	-	-	0.0156	0.0085	0.0538	13	100
1,2,3,4,6,7,8-HpCDD	-	-	0.0725	0.0119	0.4013	13	100
OCDD	-	-	0.1710	0.0272	0.6847	13	100
2,3,7,8-TCDF	-	-	0.0120	0.0091	0.0153	13	100
1,2,3,7,8-PeCDF	-	-	0.0112	0.0094	0.0139	13	100
2,3,4,7,8-PeCDF	-	-	0.0113	0.0094	0.0142	13	100
1,2,3,4,7,8-HxCDF	-	-	0.0100	0.0086	0.0120	13	100
1,2,3,6,7,8-HxCDF	-	-	0.0096	0.0083	0.0117	13	100
2,3,4,6,7,8-HxCDF	-	-	0.0111	0.0098	0.0136	13	100
1,2,3,7,8,9-HxCDF	-	-	0.0125	0.0108	0.0155	13	100
1,2,3,4,6,7,8-HpCDF	-	-	0.0098	0.0075	0.0172	13	100
1,2,3,4,7,8,9-HpCDF	-	-	0.0126	0.0108	0.0168	13	100
OCDF	-	-	0.0143	0.0097	0.0205	13	100
Total Toxic Equivalency	0.1	0	0.0364	0.0297	0.0455	13	100

Table D4: 2018 Cove Station Monitoring Results for D&F

Contaminant	Units	30-Sep-18	1-Oct-18	2-Oct-18	3-Oct-18	4-Oct-18	10-Oct-18	11-Oct-18	12-Oct-18	4-Dec-18	5-Dec-18	6-Dec-18	7-Dec-18	8-Dec-18
2,3,7,8-TCDD	pg/m^3	0.0125	Invalid	0.0119	0.0133	0.0106	0.0104	0.0092	0.0098	0.0110	0.0113	0.0125	0.0106	0.0113
1,2,3,7,8-PeCDD	pg/m^3	0.0131		0.0122	0.0118	0.0140	0.0098	0.0114	0.0098	0.0110	0.0109	0.0115	0.0109	0.0116
1,2,3,4,7,8-HxCDD	pg/m^3	0.0138		0.0131	0.0139	0.0154	0.0104	0.0098	0.0108	0.0130	0.0123	0.0118	0.0109	0.0113
1,2,3,6,7,8-HxCDD	pg/m^3	0.0135		0.0128	0.0136	0.0151	0.0104	0.0095	0.0108	0.0250	0.0109	0.0122	0.0139	0.0116
1,2,3,7,8,9-HxCDD	pg/m^3	0.0131		0.0128	0.0133	0.0151	0.0101	0.0095	0.0104	0.0281	0.0126	0.0133	0.0189	0.0106
1,2,3,4,6,7,8-HpCDD	pg/m^3	0.0846		0.0300	0.0288	0.0130	0.0182	0.0121	0.0601	0.3086	0.0689	0.0821	0.1175	0.0584
OCDD	pg/m^3	0.2394		0.0944	0.0960	0.0377	0.0717	0.0432	0.1487	0.5651	0.1706	0.2674	0.2798	0.1833
2,3,7,8-TCDF	pg/m^3	0.0141		0.0141	0.0133	0.0130	0.0101	0.0092	0.0095	0.0134	0.0297	0.0118	0.0109	0.0212
1,2,3,7,8-PeCDF	pg/m^3	0.0119		0.0109	0.0127	0.0151	0.0098	0.0098	0.0095	0.0110	0.0106	0.0118	0.0103	0.0106
2,3,4,7,8-PeCDF	pg/m^3	0.0122		0.0113	0.0127	0.0151	0.0101	0.0102	0.0098	0.0110	0.0109	0.0118	0.0103	0.0106
1,2,3,4,7,8-HxCDF	pg/m^3	0.0131		0.0106	0.0108	0.0130	0.0098	0.0073	0.0092	0.0103	0.0099	0.0122	0.0106	0.0106
1,2,3,6,7,8-HxCDF	pg/m^3	0.0125		0.0103	0.0105	0.0127	0.0094	0.0070	0.0089	0.0092	0.0089	0.0122	0.0106	0.0106
2,3,4,6,7,8-HxCDF	pg/m^3	0.0147		0.0119	0.0121	0.0147	0.0111	0.0083	0.0101	0.0110	0.0106	0.0129	0.0113	0.0113
1,2,3,7,8,9-HxCDF	pg/m^3	0.0167		0.0138	0.0139	0.0168	0.0127	0.0092	0.0117	0.0123	0.0119	0.0140	0.0123	0.0123
1,2,3,4,6,7,8-HpCDF	pg/m^3	0.0115		0.0106	0.0093	0.0092	0.0072	0.0086	0.0092	0.0168	0.0143	0.0136	0.0096	0.0102
1,2,3,4,7,8,9-HpCDF	pg/m^3	0.0167		0.0153	0.0133	0.0130	0.0104	0.0124	0.0133	0.0123	0.0137	0.0125	0.0119	0.0126
OCDF	pg/m^3	0.0131		0.0119	0.0127	0.0154	0.0107	0.0095	0.0199	0.0195	0.0109	0.0161	0.0116	0.0119
Total Toxic Equivalency	pg TEQ/m^3	0.0420		0.0384	0.0399	0.0414	0.0355	0.0313	0.0320	0.0414	0.0329	0.0391	0.0347	0.0372

NOTE: Greyed out cells indicate non-detectable results

Table D4: 2018 Cove Sta

Contaminant	MECP Criteria (µg/m^3)	No. > Criteria	Arithmetic Mean	Minimum Concentration	Maximum Concentration	Number of Valid Samples	% Valid data
2,3,7,8-TCDD	-	-	0.0112	0.0092	0.0133	12	92
1,2,3,7,8-PeCDD	-	-	0.0115	0.0098	0.0140	12	92
1,2,3,4,7,8-HxCDD	-	-	0.0122	0.0098	0.0154	12	92
1,2,3,6,7,8-HxCDD	-	-	0.0133	0.0095	0.0250	12	92
1,2,3,7,8,9-HxCDD	-	-	0.0140	0.0095	0.0281	12	92
1,2,3,4,6,7,8-HpCDD	-	-	0.0735	0.0121	0.3086	12	92
OCDD	-	-	0.1831	0.0377	0.5651	12	92
2,3,7,8-TCDF	-	-	0.0142	0.0092	0.0297	12	92
1,2,3,7,8-PeCDF	-	-	0.0112	0.0095	0.0151	12	92
2,3,4,7,8-PeCDF	-	-	0.0113	0.0098	0.0151	12	92
1,2,3,4,7,8-HxCDF	-	-	0.0106	0.0073	0.0131	12	92
1,2,3,6,7,8-HxCDF	-	-	0.0102	0.0070	0.0127	12	92
2,3,4,6,7,8-HxCDF	-	-	0.0117	0.0083	0.0147	12	92
1,2,3,7,8,9-HxCDF	-	-	0.0131	0.0092	0.0168	12	92
1,2,3,4,6,7,8-HpCDF	-	-	0.0108	0.0072	0.0168	12	92
1,2,3,4,7,8,9-HpCDF	-	-	0.0131	0.0104	0.0167	12	92
OCDF	-	-	0.0136	0.0095	0.0199	12	92
Total Toxic Equivalency	0.1	0	0.0372	0.0313	0.0420	12	92

Table D5: 2018 Monitoring Results Comparison for D&F

Contaminant	Units	Baseline											
		30-Sep-18			1-Oct-18			2-Oct-18			4-Oct-18		
		OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
		Background	Background	Background	Background	Background	Background	Background	Background	Background	Upwind	Background	Background
2,3,7,8-TCDD	pg/m^3	Invalid	0.0138	0.0125	0.0136	0.0129	Invalid	0.0114	0.0128	0.0119	0.0136	0.0105	0.0106
1,2,3,7,8-PeCDD	pg/m^3		0.0141	0.0131	0.0139	0.0110		0.0108	0.0110	0.0122	0.0110	0.0121	0.0140
1,2,3,4,7,8-HxCDD	pg/m^3		0.0151	0.0138	0.0136	0.0142		0.0130	0.0128	0.0131	0.0136	0.0144	0.0154
1,2,3,6,7,8-HxCDD	pg/m^3		0.0148	0.0135	0.0132	0.0139		0.0127	0.0125	0.0128	0.0133	0.0141	0.0151
1,2,3,7,8,9-HxCDD	pg/m^3		0.0145	0.0131	0.0132	0.0136		0.0127	0.0125	0.0128	0.0133	0.0141	0.0151
1,2,3,4,6,7,8-HpCDD	pg/m^3		0.0664	0.0846	0.0216	0.0132		0.0361	0.0421	0.0300	0.0123	0.0131	0.0130
OCDD	pg/m^3		0.1914	0.2394	0.0561	0.0375		0.1206	0.1625	0.0944	0.0385	0.0272	0.0377
2,3,7,8-TCDF	pg/m^3		0.0141	0.0141	0.0153	0.0123		0.0114	0.0128	0.0141	0.0143	0.0128	0.0130
1,2,3,7,8-PeCDF	pg/m^3		0.0122	0.0119	0.0146	0.0139		0.0123	0.0122	0.0109	0.0136	0.0134	0.0151
2,3,4,7,8-PeCDF	pg/m^3		0.0122	0.0122	0.0146	0.0142		0.0127	0.0125	0.0113	0.0140	0.0137	0.0151
1,2,3,4,7,8-HxCDF	pg/m^3		0.0105	0.0131	0.0129	0.0120		0.0114	0.0098	0.0106	0.0113	0.0109	0.0130
1,2,3,6,7,8-HxCDF	pg/m^3		0.0102	0.0125	0.0122	0.0117		0.0111	0.0095	0.0103	0.0110	0.0105	0.0127
2,3,4,6,7,8-HxCDF	pg/m^3		0.0118	0.0147	0.0143	0.0136		0.0130	0.0110	0.0119	0.0126	0.0125	0.0147
1,2,3,7,8,9-HxCDF	pg/m^3		0.0138	0.0167	0.0164	0.0155		0.0149	0.0125	0.0138	0.0143	0.0141	0.0168
1,2,3,4,6,7,8-HpCDF	pg/m^3		0.0115	0.0115	0.0115	0.0117		0.0092	0.0095	0.0106	0.0090	0.0080	0.0092
1,2,3,4,7,8,9-HpCDF	pg/m^3		0.0168	0.0167	0.0167	0.0167		0.0133	0.0134	0.0153	0.0130	0.0115	0.0130
OCDF	pg/m^3		0.0115	0.0131	0.0132	0.0205		0.0133	0.0125	0.0119	0.0146	0.0144	0.0154
Total Toxic Equivalency	pg TEQ/m^3		0.0434	0.0420	0.0439	0.0397		0.0370	0.0378	0.0384	0.0399	0.0380	0.0414

Table D5: 2018 Monitoring Results C

Contaminant	Units	Alt Fuel											
		3-Oct-18			10-Oct-18			11-Oct-18			12-Oct-18		
		OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
		Downwind	Background	Upwind	Background	Background	Background	Upwind	Downwind	Upwind	Upwind	Downwind	Downwind
2,3,7,8-TCDD	pg/m^3	0.0111	0.0101	0.0133	0.0121	0.0108	0.0104	0.0081	0.0094	0.0092	0.0079	0.0098	0.0098
1,2,3,7,8-PeCDD	pg/m^3	0.0115	0.0123	0.0118	0.0111	0.0115	0.0098	0.0104	0.0094	0.0114	0.0085	0.0098	0.0098
1,2,3,4,7,8-HxCDD	pg/m^3	0.0137	0.0126	0.0139	0.0111	0.0105	0.0104	0.0107	0.0088	0.0098	0.0101	0.0107	0.0108
1,2,3,6,7,8-HxCDD	pg/m^3	0.0134	0.0123	0.0136	0.0114	0.0108	0.0104	0.0107	0.0088	0.0095	0.0098	0.0104	0.0108
1,2,3,7,8,9-HxCDD	pg/m^3	0.0134	0.0123	0.0133	0.0108	0.0102	0.0101	0.0104	0.0085	0.0095	0.0098	0.0104	0.0104
1,2,3,4,6,7,8-HpCDD	pg/m^3	0.0328	0.0278	0.0288	0.0170	0.0178	0.0182	0.0110	0.0119	0.0121	0.0489	0.0325	0.0601
OCDD	pg/m^3	0.1022	0.1013	0.0960	0.0654	0.0608	0.0717	0.0589	0.0495	0.0432	0.1401	0.0837	0.1487
2,3,7,8-TCDF	pg/m^3	0.0134	0.0132	0.0133	0.0098	0.0111	0.0101	0.0100	0.0091	0.0092	0.0085	0.0104	0.0095
1,2,3,7,8-PeCDF	pg/m^3	0.0140	0.0136	0.0127	0.0124	0.0105	0.0098	0.0100	0.0094	0.0098	0.0088	0.0104	0.0095
2,3,4,7,8-PeCDF	pg/m^3	0.0143	0.0139	0.0127	0.0127	0.0105	0.0101	0.0104	0.0094	0.0102	0.0088	0.0107	0.0098
1,2,3,4,7,8-HxCDF	pg/m^3	0.0102	0.0104	0.0108	0.0092	0.0096	0.0098	0.0091	0.0091	0.0073	0.0095	0.0086	0.0092
1,2,3,6,7,8-HxCDF	pg/m^3	0.0099	0.0101	0.0105	0.0092	0.0099	0.0094	0.0091	0.0088	0.0070	0.0095	0.0083	0.0089
2,3,4,6,7,8-HxCDF	pg/m^3	0.0115	0.0117	0.0121	0.0098	0.0105	0.0111	0.0104	0.0100	0.0083	0.0107	0.0098	0.0101
1,2,3,7,8,9-HxCDF	pg/m^3	0.0131	0.0132	0.0139	0.0111	0.0118	0.0127	0.0120	0.0116	0.0092	0.0123	0.0110	0.0117
1,2,3,4,6,7,8-HpCDF	pg/m^3	0.0092	0.0082	0.0093	0.0095	0.0099	0.0072	0.0061	0.0075	0.0086	0.0085	0.0083	0.0092
1,2,3,4,7,8,9-HpCDF	pg/m^3	0.0134	0.0117	0.0133	0.0127	0.0131	0.0104	0.0091	0.0110	0.0124	0.0120	0.0120	0.0133
OCDF	pg/m^3	0.0102	0.0136	0.0127	0.0225	0.0197	0.0107	0.0087	0.0097	0.0095	0.0101	0.0190	0.0199
Total Toxic Equivalency	pg TEQ/m^3	0.0379	0.0372	0.0399	0.0359	0.0347	0.0355	0.0304	0.0297	0.0313	0.0281	0.0316	0.0320

Table D5: 2018 Monitoring Results C

Contaminant	Units	Alt Fuel									Baseline					
		4-Dec-18			5-Dec-18			6-Dec-18			7-Dec-18			8-Dec-18		
		OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
		Uwind	Background	Downwind	Background	Background	Background	Upwind	Background	Downwind	Background	Upwind	Background	Background	Background	Background
2,3,7,8-TCDD	pg/m^3	0.0110	0.0108	0.0110	0.0098	0.0096	0.0113	0.0214	0.0110	0.0125	0.0114	0.0099	0.0106	0.0096	0.0098	0.0113
1,2,3,7,8-PeCDD	pg/m^3	0.0106	0.0111	0.0110	0.0111	0.0099	0.0109	0.0119	0.0110	0.0115	0.0098	0.0105	0.0109	0.0102	0.0104	0.0116
1,2,3,4,7,8-HxCDD	pg/m^3	0.0130	0.0143	0.0130	0.0114	0.0125	0.0123	0.0116	0.0110	0.0118	0.0110	0.0099	0.0109	0.0105	0.0111	0.0113
1,2,3,6,7,8-HxCDD	pg/m^3	0.0233	0.0357	0.0250	0.0101	0.0109	0.0109	0.0133	0.0097	0.0122	0.0132	0.0155	0.0139	0.0109	0.0111	0.0116
1,2,3,7,8,9-HxCDD	pg/m^3	0.0249	0.0538	0.0281	0.0101	0.0109	0.0126	0.0102	0.0120	0.0133	0.0177	0.0204	0.0189	0.0099	0.0101	0.0106
1,2,3,4,6,7,8-HpCDD	pg/m^3	0.2701	0.4013	0.3086	0.0668	0.0655	0.0689	0.1551	0.0692	0.0821	0.1199	0.1276	0.1175	0.0473	0.0544	0.0584
OCDD	pg/m^3	0.5216	0.6847	0.5651	0.1671	0.1565	0.1706	0.3673	0.2003	0.2674	0.2366	0.2960	0.2798	0.1502	0.1718	0.1833
2,3,7,8-TCDF	pg/m^3	0.0183	0.0153	0.0134	0.0117	0.0131	0.0297	0.0119	0.0114	0.0118	0.0107	0.0099	0.0109	0.0131	0.0098	0.0212
1,2,3,7,8-PeCDF	pg/m^3	0.0100	0.0099	0.0110	0.0098	0.0099	0.0106	0.0116	0.0100	0.0118	0.0114	0.0099	0.0103	0.0109	0.0101	0.0106
2,3,4,7,8-PeCDF	pg/m^3	0.0100	0.0099	0.0110	0.0101	0.0099	0.0109	0.0119	0.0104	0.0118	0.0110	0.0099	0.0103	0.0109	0.0101	0.0106
1,2,3,4,7,8-HxCDF	pg/m^3	0.0100	0.0096	0.0103	0.0098	0.0105	0.0099	0.0105	0.0104	0.0122	0.0098	0.0093	0.0106	0.0099	0.0098	0.0106
1,2,3,6,7,8-HxCDF	pg/m^3	0.0090	0.0086	0.0092	0.0088	0.0096	0.0089	0.0095	0.0094	0.0122	0.0095	0.0093	0.0106	0.0099	0.0095	0.0106
2,3,4,6,7,8-HxCDF	pg/m^3	0.0106	0.0102	0.0110	0.0104	0.0115	0.0106	0.0116	0.0114	0.0129	0.0101	0.0099	0.0113	0.0105	0.0101	0.0113
1,2,3,7,8,9-HxCDF	pg/m^3	0.0120	0.0118	0.0123	0.0121	0.0128	0.0119	0.0129	0.0127	0.0140	0.0110	0.0108	0.0123	0.0115	0.0111	0.0123
1,2,3,4,6,7,8-HpCDF	pg/m^3	0.0093	0.0172	0.0168	0.0124	0.0086	0.0143	0.0095	0.0087	0.0136	0.0101	0.0090	0.0096	0.0089	0.0089	0.0102
1,2,3,4,7,8,9-HpCDF	pg/m^3	0.0123	0.0118	0.0123	0.0124	0.0121	0.0137	0.0133	0.0120	0.0125	0.0110	0.0111	0.0119	0.0109	0.0108	0.0126
OCDF	pg/m^3	0.0153	0.0175	0.0195	0.0114	0.0112	0.0109	0.0156	0.0110	0.0161	0.0126	0.0139	0.0116	0.0112	0.0108	0.0119
Total Toxic Equivalency	pg TEQ/m^3	0.0402	0.0455	0.0414	0.0336	0.0329	0.0329	0.0483	0.0351	0.0391	0.0356	0.0347	0.0347	0.0326	0.0326	0.0372

Table D10: 2018 Monitoring Results Comparison for PAHs

		Baseline											
		30-Sep-18			1-Oct-18			2-Oct-18			4-Oct-18		
Contaminant	Units	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
		Background	Background	Background	Background	Background	Background	Background	Background	Background	Upwind	Background	Background
1-Methylnaphthalene	ng/m^3	Invalid	2.27	2.69	1.67	1.14	Invalid	2.09	2.38	2.16	1.20	1.05	0.92
1-Methylphenanthrene	ng/m^3		0.49	0.48	0.52	0.47		0.47	1.01	0.47	0.50	0.48	0.82
2-Chloronaphthalene	ng/m^3		0.49	0.48	0.52	0.47		0.47	0.46	0.47	0.50	0.48	0.51
2-Methylanthracene	ng/m^3		0.49	0.48	0.52	0.47		0.47	0.46	0.47	0.50	0.48	0.51
2-Methylnaphthalene	ng/m^3		3.45	4.04	2.72	1.14		3.42	3.75	3.56	1.89	1.63	1.54
3-Methylcholanthrene	ng/m^3		9.87	9.62	10.45	9.46		9.49	9.15	9.38	9.97	9.58	10.27
7,12-Dimethylbenzo(a)anthracene	ng/m^3		1.97	1.92	2.09	1.89		1.90	1.83	1.88	1.99	1.92	2.05
9,10-Dimethylanthracene	ng/m^3		1.97	1.92	2.09	1.89		1.90	1.83	1.88	1.99	1.92	2.05
Acenaphthene	ng/m^3		1.09	0.96	0.42	1.14		0.57	0.82	0.56	0.30	0.58	0.51
Acenaphthylene	ng/m^3		0.25	0.24	0.26	0.24		0.24	0.23	0.23	0.25	0.24	0.26
Anthracene	ng/m^3		0.25	0.24	0.26	0.24		0.24	0.46	0.23	0.25	0.24	0.31
Benzo(a)Anthracene	ng/m^3		0.25	0.24	0.26	0.24		0.24	0.23	0.23	0.25	0.24	0.26
Benzo(a)fluorene	ng/m^3		0.49	0.48	0.52	0.47		0.47	0.46	0.47	0.50	0.48	0.51
Benzo(b)Fluoranthene	ng/m^3		0.25	0.24	0.26	0.24		0.24	0.23	0.23	0.25	0.24	0.26
Benzo(b)fluorene	ng/m^3		0.49	0.48	0.52	0.47		0.47	0.46	0.47	0.50	0.48	0.51
Benzo(e)Pyrene	ng/m^3		0.49	0.48	0.52	0.47		0.47	0.46	0.47	0.50	0.48	0.51
Benzo(g,h,i)Perylene	ng/m^3		0.25	0.24	0.26	0.24		0.24	0.23	0.23	0.25	0.24	0.26
Benzo(k)Fluoranthene	ng/m^3		0.25	0.24	0.26	0.24		0.24	0.23	0.23	0.25	0.24	0.26
Chrysene	ng/m^3		0.25	0.24	0.26	0.24		0.24	0.37	0.23	0.25	0.24	0.26
Coronene	ng/m^3		0.49	0.48	0.52	0.47		0.47	0.46	0.47	0.50	0.48	0.51
Dibenzo(a,h)Anthracene	ng/m^3		0.25	0.24	0.26	0.24		0.24	0.23	0.23	0.25	0.24	0.26
Dibenzo(a,c) anthracene + Picene	ng/m^3		0.49	0.48	0.52	0.47		0.47	0.46	0.47	0.50	0.48	0.51
Dibenzo(a,c)anthracene	ng/m^3		0.49	0.48	0.52	0.47		0.47	0.46	0.47	0.50	0.48	0.51
Dibenzo(a,e)pyrene	ng/m^3		0.99	0.96	1.05	0.95		0.95	0.91	0.94	1.00	0.96	1.03
Fluoranthene	ng/m^3		0.39	0.77	0.42	1.14		0.28	1.46	0.47	0.25	0.29	1.03
Fluorene	ng/m^3		1.18	1.25	0.52	1.14		0.76	1.46	0.75	0.50	0.67	0.92
Indeno(1,2,3-cd)Pyrene	ng/m^3		0.25	0.24	0.26	0.24		0.24	0.23	0.23	0.25	0.24	0.26
Naphthalene	ng/m^3		14.11	15.96	7.74	1.14		10.35	10.70	8.44	5.28	4.41	3.80
Perylene	ng/m^3		0.49	0.48	0.52	0.47		0.47	0.46	0.47	0.50	0.48	0.51
Phenanthrene	ng/m^3		2.07	3.08	1.46	1.14		1.42	5.95	1.69	1.00	1.53	4.11
Picene	ng/m^3		0.49	0.48	0.52	0.47		0.47	0.46	0.47	0.50	0.48	0.51
Pyrene	ng/m^3		0.30	0.48	0.31	1.14		0.24	1.10	0.28	0.25	0.29	0.82
Tetralin	ng/m^3		0.99	1.35	0.84	1.14		1.14	1.65	1.78	0.70	0.58	0.62
Benzo(a)Pyrene	ng/m^3		0.04	0.05	0.02	0.03		0.02	0.02	0.05	0.01	0.02	0.07
Total PAH[4]	ng/m^3		48.35	52.50	39.90	31.78		41.89	51.01	41.07	34.05	32.85	38.08

NOTE: Greyed out cells indicate non-detectable results

Table D10: 2018 Monitoring Results Compa

		Alt Fuel											
		3-Oct-18			10-Oct-18			11-Oct-18			12-Oct-18		
Contaminant	Units	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
		Downwind	Background	Upwind	Background	Background	Background	Upwind	Downwind	Upwind	Upwind	Downwind	Downwind
1-Methylnaphthalene	ng/m^3	2.20	1.70	1.49	5.59	3.63	3.62	2.04	2.82	4.38	2.27	2.94	3.04
1-Methylphenanthrene	ng/m^3	0.48	0.47	0.74	0.49	0.67	0.68	0.49	0.47	0.48	0.47	0.46	0.47
2-Chloronaphthalene	ng/m^3	0.48	0.47	0.46	0.49	0.48	0.49	0.49	0.47	0.48	0.47	0.46	0.47
2-Methylanthracene	ng/m^3	0.48	0.47	0.46	0.49	0.48	0.49	0.49	0.47	0.48	0.47	0.46	0.47
2-Methylnaphthalene	ng/m^3	3.63	2.65	2.41	8.92	5.64	5.57	3.50	4.70	6.76	3.88	4.88	4.84
3-Methylcholanthrene	ng/m^3	9.55	9.46	9.29	9.80	9.55	9.77	9.71	9.40	9.52	9.46	9.20	9.49
7,12-Dimethylbenzo(a)anthracene	ng/m^3	1.91	1.89	1.86	1.96	1.91	1.95	1.94	1.88	1.90	1.89	1.84	1.90
9,10-Dimethylanthracene	ng/m^3	1.91	1.89	1.86	1.96	1.91	1.95	1.94	1.88	1.90	1.89	1.84	1.90
Acenaphthene	ng/m^3	0.57	0.47	0.56	2.06	1.43	1.17	1.07	0.85	0.95	0.76	0.83	0.85
Acenaphthylene	ng/m^3	0.24	0.24	0.23	0.25	0.24	0.24	0.24	0.24	0.24	0.24	0.23	0.24
Anthracene	ng/m^3	0.24	0.47	0.28	0.25	0.24	0.24	0.24	0.24	0.24	0.24	0.23	0.24
Benzo(a)Anthracene	ng/m^3	0.24	0.24	0.23	0.25	0.24	0.24	0.24	0.24	0.24	0.24	0.23	0.24
Benzo(a)fluorene	ng/m^3	0.48	0.47	0.46	0.49	0.48	0.49	0.49	0.47	0.48	0.47	0.46	0.47
Benzo(b)Fluoranthene	ng/m^3	0.24	0.24	0.23	0.25	0.24	0.24	0.24	0.24	0.24	0.24	0.23	0.24
Benzo(b)fluorene	ng/m^3	0.48	0.47	0.46	0.49	0.48	0.49	0.49	0.47	0.48	0.47	0.46	0.47
Benzo(e)Pyrene	ng/m^3	0.48	0.47	0.46	0.49	0.48	0.49	0.49	0.47	0.48	0.47	0.46	0.47
Benzo(g,h,i)Perylene	ng/m^3	0.24	0.24	0.23	0.25	0.24	0.24	0.24	0.24	0.24	0.24	0.23	0.24
Benzo(k)Fluoranthene	ng/m^3	0.24	0.24	0.23	0.25	0.24	0.24	0.24	0.24	0.24	0.24	0.23	0.24
Chrysene	ng/m^3	0.24	0.24	0.23	0.25	0.29	0.29	0.24	0.28	0.24	0.24	0.23	0.24
Coronene	ng/m^3	0.48	0.47	0.46	0.49	0.48	0.49	0.49	0.47	0.48	0.47	0.46	0.47
Dibenzo(a,h)Anthracene	ng/m^3	0.24	0.24	0.23	0.25	0.24	0.24	0.24	0.24	0.24	0.24	0.23	0.24
Dibenzo(a,c) anthracene + Picene	ng/m^3	0.48	0.47	0.46	0.49	0.48	0.49	0.49	0.47	0.48	0.47	0.46	0.47
Dibenzo(a,c)anthracene	ng/m^3	0.48	0.47	0.46	0.49	0.48	0.49	0.49	0.47	0.48	0.47	0.46	0.47
Dibenzo(a,e)pyrene	ng/m^3	0.96	0.95	0.93	0.98	0.96	0.98	0.97	0.94	0.95	0.95	0.92	0.95
Fluoranthene	ng/m^3	0.48	0.85	1.30	1.37	1.43	1.66	0.39	0.85	0.57	0.38	0.28	0.28
Fluorene	ng/m^3	0.76	1.51	1.21	2.25	2.58	1.95	1.17	1.22	1.14	0.66	0.74	0.76
Indeno(1,2,3-cd)Pyrene	ng/m^3	0.24	0.24	0.23	0.25	0.24	0.24	0.24	0.24	0.24	0.24	0.23	0.24
Naphthalene	ng/m^3	8.60	7.48	6.78	21.37	15.29	15.24	10.87	11.66	13.05	10.79	10.21	10.25
Perylene	ng/m^3	0.48	0.47	0.46	0.49	0.48	0.49	0.49	0.47	0.48	0.47	0.46	0.47
Phenanthrene	ng/m^3	1.72	3.88	4.64	5.10	6.02	6.06	2.14	3.39	2.76	1.42	1.20	1.42
Picene	ng/m^3	0.48	0.47	0.46	0.49	0.48	0.49	0.49	0.47	0.48	0.47	0.46	0.47
Pyrene	ng/m^3	0.29	0.85	0.93	0.69	1.43	1.17	0.24	0.56	0.38	0.24	0.23	0.24
Tetralin	ng/m^3	1.82	0.85	0.84	3.73	1.72	1.86	0.97	1.88	2.38	1.14	2.21	1.80
Benzo(a)Pyrene	ng/m^3	0.02	0.02	0.02	0.02	0.03	0.02	0.01	0.02	0.00	0.02	0.01	0.02
Total PAH[4]	ng/m^3	41.82	42.04	41.63	73.41	61.17	60.80	44.48	49.39	54.05	43.08	44.46	45.11

Table D10: 2018 Monitoring Results Compa

		Alt Fuel									Baseline					
		4-Dec-18			5-Dec-18			6-Dec-18			7-Dec-18			8-Dec-18		
Contaminant	Units	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
		Uwind	Background	Downwind	Background	Background	Background	Upwind	Background	Downwind	Background	Upwind	Background	Background	Background	Background
1-Methylnaphthalene	ng/m^3	4.98	6.50	7.09	5.67	6.90	7.99	3.16	3.21	3.01	2.65	2.32	2.19	3.16	3.61	3.69
1-Methylphenanthrene	ng/m^3	0.50	0.57	0.51	0.49	0.48	0.51	0.51	0.50	0.54	0.47	0.46	0.50	0.48	0.47	0.51
2-Chloronaphthalene	ng/m^3	0.50	0.48	0.51	0.49	0.48	0.51	0.51	0.50	0.54	0.47	0.46	0.50	0.48	0.47	0.51
2-Methylanthracene	ng/m^3	0.50	0.48	0.51	0.49	0.48	0.51	0.51	0.50	0.54	0.47	0.46	0.50	0.48	0.47	0.51
2-Methylnaphthalene	ng/m^3	7.97	10.32	11.10	9.48	11.31	13.00	5.20	5.12	4.73	4.26	3.53	3.18	5.37	5.79	5.84
3-Methylcholanthrene	ng/m^3	9.97	9.55	10.27	9.77	9.58	10.24	10.20	10.03	10.75	9.46	9.29	9.93	9.58	9.49	10.24
7,12-Dimethylbenzo(a)anthracene	ng/m^3	1.99	1.91	2.05	1.95	1.92	2.05	2.04	2.01	2.15	1.89	1.86	1.99	1.92	1.90	2.05
9,10-Dimethylanthracene	ng/m^3	1.99	1.91	2.05	1.95	1.92	2.05	2.04	2.01	2.15	1.89	1.86	1.99	1.92	1.90	2.05
Acenaphthene	ng/m^3	0.60	0.86	0.62	0.68	0.58	0.72	0.51	0.40	0.43	0.28	0.37	0.30	0.38	0.47	0.41
Acenaphthylene	ng/m^3	1.50	2.01	1.34	0.24	0.24	0.26	0.26	0.25	0.27	0.28	0.23	0.25	0.24	0.24	0.26
Anthracene	ng/m^3	0.25	0.24	0.26	0.24	0.24	0.26	0.26	0.25	0.27	0.24	0.23	0.25	0.24	0.24	0.26
Benzo(a)Anthracene	ng/m^3	0.30	0.48	0.31	0.24	0.24	0.26	0.26	0.25	0.27	0.24	0.23	0.25	0.24	0.24	0.26
Benzo(a)fluorene	ng/m^3	0.50	0.48	0.51	0.49	0.48	0.51	0.51	0.50	0.54	0.47	0.46	0.50	0.48	0.47	0.51
Benzo(b)Fluoranthene	ng/m^3	0.50	0.67	0.41	0.24	0.29	0.26	0.26	0.25	0.27	0.24	0.23	0.25	0.24	0.24	0.26
Benzo(b)fluorene	ng/m^3	0.50	0.48	0.51	0.49	0.48	0.51	0.51	0.50	0.54	0.47	0.46	0.50	0.48	0.47	0.51
Benzo(e)Pyrene	ng/m^3	0.50	0.48	0.51	0.49	0.48	0.51	0.51	0.50	0.54	0.47	0.46	0.50	0.48	0.47	0.51
Benzo(g,h,i)Perylene	ng/m^3	0.30	0.38	0.31	0.24	0.24	0.26	0.26	0.25	0.27	0.24	0.23	0.25	0.24	0.24	0.26
Benzo(k)Fluoranthene	ng/m^3	0.25	0.24	0.26	0.24	0.24	0.26	0.26	0.25	0.27	0.24	0.23	0.25	0.24	0.24	0.26
Chrysene	ng/m^3	0.40	0.57	0.41	0.24	0.29	0.31	0.26	0.25	0.27	0.24	0.23	0.25	0.24	0.24	0.26
Coronene	ng/m^3	0.50	0.48	0.51	0.49	0.48	0.51	0.51	0.50	0.54	0.47	0.46	0.50	0.48	0.47	0.51
Dibenzo(a,h)Anthracene	ng/m^3	0.25	0.24	0.26	0.24	0.24	0.26	0.26	0.25	0.27	0.24	0.23	0.25	0.24	0.24	0.26
Dibenzo(a,c) anthracene + Picene	ng/m^3	0.50	0.48	0.51	0.49	0.48	0.51	0.51	0.50	0.54	0.47	0.46	0.50	0.48	0.47	0.51
Dibenzo(a,c)anthracene	ng/m^3	0.50	0.48	0.51	0.49	0.48	0.51	0.51	0.50	0.54	0.47	0.46	0.50	0.48	0.47	0.51
Dibenzo(a,e)pyrene	ng/m^3	1.00	0.96	1.03	0.98	0.96	1.02	1.02	1.00	1.08	0.95	0.93	0.99	0.96	0.95	1.02
Fluoranthene	ng/m^3	0.70	0.96	0.72	0.68	0.67	0.72	0.41	0.40	0.32	0.57	0.56	0.40	0.38	0.57	0.41
Fluorene	ng/m^3	0.90	1.72	0.92	0.98	1.05	1.13	0.71	0.80	0.65	0.57	0.84	0.50	0.67	1.04	0.72
Indeno(1,2,3-cd)Pyrene	ng/m^3	0.25	0.29	0.26	0.24	0.24	0.26	0.26	0.25	0.27	0.24	0.23	0.25	0.24	0.24	0.26
Naphthalene	ng/m^3	27.41	35.99	29.69	31.76	36.10	39.59	17.45	14.35	15.48	15.80	14.30	12.81	17.92	15.66	17.30
Perylene	ng/m^3	0.50	0.48	0.51	0.49	0.48	0.51	0.51	0.50	0.54	0.47	0.46	0.50	0.48	0.47	0.51
Phenanthrene	ng/m^3	2.09	3.63	2.26	2.05	2.30	2.35	1.43	1.61	1.29	1.61	2.04	1.19	1.44	2.66	1.74
Picene	ng/m^3	0.50	0.48	0.51	0.49	0.48	0.51	0.51	0.50	0.54	0.47	0.46	0.50	0.48	0.47	0.51
Pyrene	ng/m^3	0.60	1.05	0.62	0.49	0.58	0.51	0.26	0.30	0.27	0.47	0.56	0.30	0.29	0.66	0.26
Tetralin	ng/m^3	2.29	3.44	4.42	2.25	3.45	3.79	1.63	1.61	1.83	1.04	1.02	1.09	1.34	1.90	1.95
Benzo(a)Pyrene	ng/m^3	0.25	0.44	0.31	0.11	0.26	0.20	0.04	0.05	0.05	0.06	0.09	0.00	0.05	0.06	0.05
Total PAH[4]	ng/m^3	72.21	89.69	82.60	76.38	85.10	93.34	54.02	50.67	52.53	48.90	46.76	44.56	52.82	54.03	55.65

APPENDIX E

Table E1: Q3 Summary of Sample Canister Pressures and Durations for VOCs/Total Reduced Sulfurs at OPG, Cove and Beach Sampling Stations

Sample Date	OPG			Cove			Beach		
	Sample Duration (min)	Initial Canister Pressure ("Hg)	Final Canister Pressure ("Hg)	Sample Duration (min)	Initial Canister Pressure ("Hg)	Final Canister Pressure ("Hg)	Sample Duration (min)	Initial Canister Pressure ("Hg)	Final Canister Pressure ("Hg)
September 30, 2018	1370	-27	-10	1333	-29	-10	1364	-31	-10
October 1, 2018	1302	-31	-5	1390	-29	-6	1389	-27	-5
October 2, 2018	1422	-30	-5	1435	-28	-6	1435	-29	-6
October 3, 2018	1423	-28	-5	1409	-29	-6	1410	-28	-5
October 4, 2018	1386	-28	-6	1367	-28	-7	1352	-28	-7
October 10, 2018	1401	-28	-5	1403	-29	-6	1402	-28	-9
October 11, 2018	1412	-29	-5	1408	-28	-7	1414	-29	-8
October 12, 2018	1430	-27	-4	1418	-29	-6	1401	-28	-6
December 4, 2018	1422	-25	-3	1423	-27	-2.5	1426	-29	-3
December 5, 2018	1456	-26	-2.5	1457	-27	-3.5	Unrecovered Sample		
December 6, 2018	1355	-27	-5	1355	-27	-4	1095	-28	-6
December 7, 2018	1329	-25	-4	1352	-26	-3	1366	-25	-2
December 8, 2018	1439	-27	-5	1424	-26	-4	1416	-26	-4

Note: Final Canister Pressures recorded from ALS Lab reports

Table E2: OPG Monitoring Results for VOCs

St Marys Cement (1804600)

Contaminant	Units	30-Sep-18	1-Oct-18	2-Oct-18	3-Oct-18	4-Oct-18	10-Oct-18	11-Oct-18	12-Oct-18	4-Dec-18	5-Dec-18	6-Dec-18	7-Dec-18	8-Dec-18
2-Propanone	µg/m³	5.58	6.67	3.82	7.71	6.43	25.87	6.27	3.42	2.47	4.25	3.99	2.11	3.80
Chloromethane	µg/m³	0.91	0.93	0.89	0.97	0.93	1.01	0.97	0.95	1.07	1.16	1.16	1.13	1.16
Vinyl Chloride	µg/m³	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Chloroethane	µg/m³	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Methyl Ethyl Ketone (2-Butanone)	µg/m³	0.29	0.29	0.29	0.29	0.29	0.29	2.95	2.95	0.80	1.41	1.41	0.68	1.09
cis-1,2-Dichloroethylene	µg/m³	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
trans-1,2-Dichloroethylene	µg/m³	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Methylene Chloride(Dichloromethane)	µg/m³	0.41	0.82	0.38	0.41	0.39	0.45	0.41	0.46	0.59	0.61	0.63	0.60	0.67
Chloroform	µg/m³	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Carbon Tetrachloride	µg/m³	0.75	0.80	0.77	0.86	0.64	0.75	0.82	0.87	0.79	0.78	0.89	0.89	0.78
1,1-Dichloroethane	µg/m³	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
1,2-Dichloroethane	µg/m³	0.07	0.06	0.06	0.06	0.06	0.06	0.07	0.06	0.13	0.13	0.14	0.13	0.13
Ethylene Dibromide	µg/m³	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
1,1,1-Trichloroethane	µg/m³	0.33	0.33	0.33	0.33	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
1,1,2-Trichloroethane	µg/m³	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
1,1,2,2-Tetrachloroethane	µg/m³	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
1,2-Dichloropropane	µg/m³	0.46	0.44	0.24	0.24	0.24	0.24	0.28	0.24	0.24	0.24	0.24	0.24	0.24
Bromoform	µg/m³	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
Bromomethane	µg/m³	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
Bromodichloromethane	µg/m³	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34
Dibromochloromethane	µg/m³	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
Trichloroethylene	µg/m³	0.32	0.32	0.32	0.32	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Tetrachloroethylene	µg/m³	0.41	0.41	0.41	0.56	0.34	0.34	1.34	0.34	0.34	0.34	0.34	0.34	0.34
Benzene	µg/m³	1.95	0.42	0.35	0.31	0.24	0.46	0.22	0.23	0.56	0.62	0.49	0.44	0.58
Toluene	µg/m³	0.63	0.78	0.55	0.49	0.40	0.91	0.56	0.39	0.71	1.22	0.63	0.33	0.62
Ethylbenzene	µg/m³	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
p+m-Xylene	µg/m³	0.43	0.43	0.43	0.43	0.43	0.69	0.43	0.43	0.43	0.56	0.43	0.43	0.43
o-Xylene	µg/m³	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Styrene	µg/m³	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.23	0.21	0.21	0.21	0.21
Chlorobenzene	µg/m³	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Cumene (Isopropylbenzene)	µg/m³	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46
Total Xylenes	µg/m³	2.60	2.60	2.60	2.60	2.60	2.78	2.60	2.60	2.60	2.95	2.60	2.60	2.60
1,1,1,2-Tetrachloroethane	µg/m³	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14

Greyed out cells indicate non-detectable results

Table E2: OPG Monitoring Results for VOCs

St Marys Cement (1804600)

Contaminant	Geometric Mean	Arithmetic Mean	Minimum Concentration	Maximum Concentration	Number of Valid Samples	% Valid data
2-Propanone	5.03	6.34	2.11	25.87	13	100
Chloromethane	1.01	1.02	0.89	1.16	13	100
Vinyl Chloride	0.05	0.05	0.05	0.05	13	100
Chloroethane	0.79	0.79	0.79	0.79	13	100
Methyl Ethyl Ketone (2-Butanone)	0.68	1.00	0.29	2.95	13	100
cis-1,2-Dichloroethylene	0.20	0.20	0.20	0.20	13	100
trans-1,2-Dichloroethylene	0.40	0.40	0.40	0.40	13	100
Methylene Chloride(Dichloromethane)	0.51	0.52	0.38	0.82	13	100
Chloroform	0.20	0.20	0.20	0.20	13	100
Carbon Tetrachloride	0.80	0.80	0.64	0.89	13	100
1,1-Dichloroethane	0.20	0.20	0.20	0.20	13	100
1,2-Dichloroethane	0.08	0.09	0.06	0.14	13	100
Ethylene Dibromide	0.08	0.08	0.08	0.08	13	100
1,1,1-Trichloroethane	0.29	0.29	0.27	0.33	13	100
1,1,2-Trichloroethane	0.07	0.07	0.07	0.07	13	100
1,1,2,2-Tetrachloroethane	0.02	0.02	0.02	0.02	13	100
1,2-Dichloropropane	0.26	0.27	0.24	0.46	13	100
Bromoform	0.52	0.52	0.52	0.52	13	100
Bromomethane	0.39	0.39	0.39	0.39	13	100
Bromodichloromethane	1.34	1.34	1.34	1.34	13	100
Dibromochloromethane	1.70	1.70	1.70	1.70	13	100
Trichloroethylene	0.28	0.29	0.27	0.32	13	100
Tetrachloroethylene	0.41	0.45	0.34	1.34	13	100
Benzene	0.44	0.53	0.22	1.95	13	100
Toluene	0.59	0.63	0.33	1.22	13	100
Ethylbenzene	0.22	0.22	0.22	0.22	13	100
p+m-Xylene	0.46	0.46	0.43	0.69	13	100
o-Xylene	0.22	0.22	0.22	0.22	13	100
Styrene	0.21	0.21	0.21	0.23	13	100
Chlorobenzene	0.23	0.23	0.23	0.23	13	100
Cumene (Isopropylbenzene)	2.46	2.46	2.46	2.46	13	100
Total Xylenes	2.64	2.64	2.60	2.95	13	100
1,1,1,2-Tetrachloroethane	0.14	0.14	0.14	0.14	13	100

Greyed out cells indicate non-detectable result

Table E3: Cove Monitoring Results for VOCs

St Marys Cement (1804600)

Contaminant	Units	30-Sep-18	1-Oct-18	2-Oct-18	3-Oct-18	4-Oct-18	10-Oct-18	11-Oct-18	12-Oct-18	4-Dec-18	5-Dec-18	6-Dec-18	7-Dec-18	8-Dec-18
2-Propanone	µg/m³	5.86	3.63	4.46	4.51	6.43	6.46	3.16	4.37	7.22	4.79	3.16	5.25	3.80
Chloromethane	µg/m³	0.91	0.91	0.87	0.97	0.93	1.01	0.93	0.95	1.07	1.11	1.11	1.16	1.18
Vinyl Chloride	µg/m³	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Chloroethane	µg/m³	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Methyl Ethyl Ketone (2-Butanone)	µg/m³	0.29	0.29	0.29	0.29	0.29	0.29	2.95	0.29	1.21	1.30	0.88	0.83	1.06
cis-1,2-Dichloroethylene	µg/m³	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
trans-1,2-Dichloroethylene	µg/m³	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Methylene Chloride(Dichloromethane)	µg/m³	0.41	0.33	0.48	0.38	0.39	0.43	0.39	0.68	0.57	0.66	0.53	0.67	0.52
Chloroform	µg/m³	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Carbon Tetrachloride	µg/m³	0.75	0.87	0.79	0.85	0.64	0.80	0.84	0.85	0.80	0.77	0.92	0.96	0.89
1,1-Dichloroethane	µg/m³	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
1,2-Dichloroethane	µg/m³	0.06	0.06	0.07	0.06	0.06	0.05	0.06	0.06	0.13	0.14	0.14	0.13	0.13
Ethylene Dibromide	µg/m³	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
1,1,1-Trichloroethane	µg/m³	0.33	0.33	0.33	0.33	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
1,1,2-Trichloroethane	µg/m³	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
1,1,2,2-Tetrachloroethane	µg/m³	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
1,2-Dichloropropane	µg/m³	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Bromoform	µg/m³	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
Bromomethane	µg/m³	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
Bromodichloromethane	µg/m³	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34
Dibromochloromethane	µg/m³	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
Trichloroethylene	µg/m³	0.32	0.32	0.32	0.32	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Tetrachloroethylene	µg/m³	0.41	0.41	0.41	0.41	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Benzene	µg/m³	0.36	0.22	0.30	0.33	0.24	0.27	0.24	0.22	0.62	0.86	0.53	0.40	0.51
Toluene	µg/m³	0.80	0.36	0.68	0.54	0.40	0.96	0.55	0.60	0.87	1.62	0.61	0.32	0.56
Ethylbenzene	µg/m³	0.22	0.32	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.29	0.22	0.22	0.22
p+m-Xylene	µg/m³	0.43	1.17	0.52	0.43	0.43	0.43	0.43	0.43	0.56	0.91	0.43	0.43	0.43
o-Xylene	µg/m³	0.22	0.37	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.35	0.22	0.22	0.22
Styrene	µg/m³	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.93	0.21	0.21	0.21
Chlorobenzene	µg/m³	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Cumene (Isopropylbenzene)	µg/m³	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46
Total Xylenes	µg/m³	2.60	6.07	2.60	2.60	2.60	2.60	2.60	2.60	2.60	5.03	2.60	2.60	2.60
1,1,1,2-Tetrachloroethane	µg/m³	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14

Greyed out cells indicate non-detectable results

Table E3: Cove Monitoring Results for VOCs

St Marys Cement (1804600)

Contaminant	Geometric Mean	Arithmetic Mean	Minimum Concentration	Maximum Concentration	Number of Valid Samples	% Valid data
2-Propanone	4.69	4.85	3.16	7.22	13	100
Chloromethane	1.00	1.01	0.87	1.18	13	100
Vinyl Chloride	0.05	0.05	0.05	0.05	13	100
Chloroethane	0.79	0.79	0.79	0.79	13	100
Methyl Ethyl Ketone (2-Butanone)	0.57	0.79	0.29	2.95	13	100
cis-1,2-Dichloroethylene	0.20	0.20	0.20	0.20	13	100
trans-1,2-Dichloroethylene	0.40	0.40	0.40	0.40	13	100
Methylene Chloride(Dichloromethane)	0.48	0.50	0.33	0.68	13	100
Chloroform	0.20	0.20	0.20	0.20	13	100
Carbon Tetrachloride	0.82	0.83	0.64	0.96	13	100
1,1-Dichloroethane	0.20	0.20	0.20	0.20	13	100
1,2-Dichloroethane	0.08	0.09	0.05	0.14	13	100
Ethylene Dibromide	0.08	0.08	0.08	0.08	13	100
1,1,1-Trichloroethane	0.29	0.29	0.27	0.33	13	100
1,1,2-Trichloroethane	0.07	0.07	0.07	0.07	13	100
1,1,2,2-Tetrachloroethane	0.02	0.02	0.02	0.02	13	100
1,2-Dichloropropane	0.24	0.24	0.24	0.24	13	100
Bromoform	0.52	0.52	0.52	0.52	13	100
Bromomethane	0.39	0.39	0.39	0.39	13	100
Bromodichloromethane	1.34	1.34	1.34	1.34	13	100
Dibromochloromethane	1.70	1.70	1.70	1.70	13	100
Trichloroethylene	0.28	0.29	0.27	0.32	13	100
Tetrachloroethylene	0.36	0.36	0.34	0.41	13	100
Benzene	0.36	0.39	0.22	0.86	13	100
Toluene	0.62	0.68	0.32	1.62	13	100
Ethylbenzene	0.23	0.23	0.22	0.32	13	100
p+m-Xylene	0.51	0.54	0.43	1.17	13	100
o-Xylene	0.23	0.24	0.22	0.37	13	100
Styrene	0.24	0.27	0.21	0.93	13	100
Chlorobenzene	0.23	0.23	0.23	0.23	13	100
Cumene (Isopropylbenzene)	2.46	2.46	2.46	2.46	13	100
Total Xylenes	2.92	3.06	2.60	6.07	13	100
1,1,1,2-Tetrachloroethane	0.14	0.14	0.14	0.14	13	100

Greyed out cells indicate non-detectable results

Table E4: Cove Monitoring Results for VOCs

St Marys Cement (1804600)

Contaminant	Units	30-Sep-18	1-Oct-18	2-Oct-18	3-Oct-18	4-Oct-18	10-Oct-18	11-Oct-18	12-Oct-18	4-Dec-18	5-Dec-18	6-Dec-18	7-Dec-18	8-Dec-18
2-Propanone	µg/m^3	9.71	4.15	4.94	0.36	9.52	13.51	5.22	8.21	2.49	Unrecovered Sample	2.44	1.95	1.73
Chloromethane	µg/m^3	0.89	0.89	0.93	0.62	0.91	1.05	0.95	0.97	1.03		1.16	1.09	1.11
Vinyl Chloride	µg/m^3	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05		0.05	0.05	0.05
Chloroethane	µg/m^3	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79		0.79	0.79	0.79
Methyl Ethyl Ketone (2-Butanone)	µg/m^3	0.29	0.29	0.29	0.29	0.29	2.62	2.95	0.29	0.68		1.80	0.56	0.77
cis-1,2-Dichloroethylene	µg/m^3	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20		0.20	0.20	0.20
trans-1,2-Dichloroethylene	µg/m^3	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40		0.40	0.40	0.40
Methylene Chloride(Dichloromethane)	µg/m^3	0.63	0.39	0.37	0.17	0.33	0.48	0.37	1.10	0.54		0.64	0.47	0.53
Chloroform	µg/m^3	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20		0.20	0.20	0.20
Carbon Tetrachloride	µg/m^3	0.73	0.87	0.82	0.31	0.65	0.78	0.83	0.79	0.82		0.93	0.94	0.99
1,1-Dichloroethane	µg/m^3	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20		0.20	0.20	0.20
1,2-Dichloroethane	µg/m^3	0.06	0.06	0.07	0.04	0.06	0.06	0.06	0.07	0.13		0.14	0.13	0.14
Ethylene Dibromide	µg/m^3	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08		0.08	0.08	0.08
1,1,1-Trichloroethane	µg/m^3	0.33	0.33	0.33	0.33	0.27	0.27	0.27	0.27	0.27		0.27	0.27	0.27
1,1,2-Trichloroethane	µg/m^3	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07		0.07	0.07	0.07
1,1,2,2-Tetrachloroethane	µg/m^3	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02		0.02	0.02	0.02
1,2-Dichloropropane	µg/m^3	0.24	0.24	0.35	0.24	0.24	0.24	0.30	0.41	0.24		0.24	0.24	0.24
Bromoform	µg/m^3	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52		0.52	0.52	0.52
Bromomethane	µg/m^3	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39		0.39	0.39	0.39
Bromodichloromethane	µg/m^3	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34		1.34	1.34	1.34
Dibromochloromethane	µg/m^3	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70		1.70	1.70	1.70
Trichloroethylene	µg/m^3	0.32	0.32	0.32	0.32	0.27	0.27	0.27	0.27	0.27		0.27	0.27	0.27
Tetrachloroethylene	µg/m^3	0.41	0.41	0.41	0.41	0.34	0.34	0.34	0.34	0.34		0.34	0.34	0.34
Benzene	µg/m^3	0.40	0.30	0.31	0.16	1.67	0.62	0.24	0.41	0.73		0.51	0.40	0.55
Toluene	µg/m^3	0.76	0.35	0.56	0.19	0.39	1.24	0.40	0.72	1.03		0.79	0.26	0.58
Ethylbenzene	µg/m^3	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22		0.22	0.22	0.22
p+m-Xylene	µg/m^3	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.48		0.43	0.43	0.43
o-Xylene	µg/m^3	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22		0.22	0.22	0.22
Styrene	µg/m^3	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21		0.21	0.21	0.21
Chlorobenzene	µg/m^3	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23		0.23	0.23	0.23
Cumene (Isopropylbenzene)	µg/m^3	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46		2.46	2.46	2.46
Total Xylenes	µg/m^3	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60		2.60	2.60	2.60
1,1,1,2-Tetrachloroethane	µg/m^3	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14		0.14	0.14	0.14

Greyed out cells indicate non-detectable results

Table E4: Cove Monitoring Results for VOCs

St Marys Cement (1804600)

Contaminant	Geometric Mean	Arithmetic Mean	Minimum Concentration	Maximum Concentration	Number of Valid Samples	% Valid data
2-Propanone	3.76	5.35	0.36	13.51	12	92
Chloromethane	0.96	0.97	0.62	1.16	12	92
Vinyl Chloride	0.05	0.05	0.05	0.05	12	92
Chloroethane	0.79	0.79	0.79	0.79	12	92
Methyl Ethyl Ketone (2-Butanone)	0.61	0.93	0.29	2.95	12	92
cis-1,2-Dichloroethylene	0.20	0.20	0.20	0.20	12	92
trans-1,2-Dichloroethylene	0.40	0.40	0.40	0.40	12	92
Methylene Chloride(Dichloromethane)	0.46	0.50	0.17	1.10	12	92
Chloroform	0.20	0.20	0.20	0.20	12	92
Carbon Tetrachloride	0.76	0.79	0.31	0.99	12	92
1,1-Dichloroethane	0.20	0.20	0.20	0.20	12	92
1,2-Dichloroethane	0.08	0.09	0.04	0.14	12	92
Ethylene Dibromide	0.08	0.08	0.08	0.08	12	92
1,1,1-Trichloroethane	0.29	0.29	0.27	0.33	12	92
1,1,2-Trichloroethane	0.07	0.07	0.07	0.07	12	92
1,1,2,2-Tetrachloroethane	0.02	0.02	0.02	0.02	12	92
1,2-Dichloropropane	0.26	0.27	0.24	0.41	12	92
Bromoform	0.52	0.52	0.52	0.52	12	92
Bromomethane	0.39	0.39	0.39	0.39	12	92
Bromodichloromethane	1.34	1.34	1.34	1.34	12	92
Dibromochloromethane	1.70	1.70	1.70	1.70	12	92
Trichloroethylene	0.29	0.29	0.27	0.32	12	92
Tetrachloroethylene	0.36	0.36	0.34	0.41	12	92
Benzene	0.44	0.52	0.16	1.67	12	92
Toluene	0.53	0.61	0.19	1.24	12	92
Ethylbenzene	0.22	0.22	0.22	0.22	12	92
p+m-Xylene	0.44	0.44	0.43	0.48	12	92
o-Xylene	0.22	0.22	0.22	0.22	12	92
Styrene	0.21	0.21	0.21	0.21	12	92
Chlorobenzene	0.23	0.23	0.23	0.23	12	92
Cumene (Isopropylbenzene)	2.46	2.46	2.46	2.46	12	92
Total Xylenes	2.60	2.60	2.60	2.60	12	92
1,1,1,2-Tetrachloroethane	0.14	0.14	0.14	0.14	12	92

Greyed out cells indicate non-detectable results

Table E5: 2018 Monitoring Results Comparison for VOCs

St Marys Cement (1804600)

Contaminant	Units	Baseline											
		30-Sep-18			1-Oct-18			2-Oct-18			4-Oct-18		
		OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
		Background	Background	Background	Background	Background	Background	Background	Background	Background	Upwind	Background	Background
2-Propanone	μg/m^3	5.58	5.86	9.71	6.67	3.63	4.15	3.82	4.46	4.94	6.43	6.43	2.49
Chloromethane	μg/m^3	0.91	0.91	0.89	0.93	0.91	0.89	0.89	0.87	0.93	0.93	0.93	1.03
Vinyl Chloride	μg/m^3	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Chloroethane	μg/m^3	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Methyl Ethyl Ketone (2-Butanone)	μg/m^3	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.68
cis-1,2-Dichloroethylene	μg/m^3	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
trans-1,2-Dichloroethylene	μg/m^3	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Methylene Chloride(Dichloromethane)	μg/m^3	0.41	0.41	0.63	0.82	0.33	0.39	0.38	0.48	0.37	0.39	0.39	0.54
Chloroform	μg/m^3	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Carbon Tetrachloride	μg/m^3	0.75	0.75	0.73	0.80	0.87	0.87	0.77	0.79	0.82	0.64	0.64	0.82
1,1-Dichloroethane	μg/m^3	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
1,2-Dichloroethane	μg/m^3	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.06	0.06	0.13
Ethylene Dibromide	μg/m^3	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
1,1,1-Trichloroethane	μg/m^3	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.27	0.27	0.27
1,1,2-Trichloroethane	μg/m^3	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
1,1,2,2-Tetrachloroethane	μg/m^3	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
1,2-Dichloropropane	μg/m^3	0.46	0.24	0.24	0.44	0.24	0.24	0.24	0.24	0.35	0.24	0.24	0.24
Bromoform	μg/m^3	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
Bromomethane	μg/m^3	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
Bromodichloromethane	μg/m^3	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34
Dibromochloromethane	μg/m^3	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
Trichloroethylene	μg/m^3	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.27	0.27	0.27
Tetrachloroethylene	μg/m^3	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.34	0.34	0.34
Benzene	μg/m^3	1.95	0.36	0.40	0.42	0.22	0.30	0.35	0.30	0.31	0.24	0.24	0.73
Toluene	μg/m^3	0.63	0.80	0.76	0.78	0.36	0.35	0.55	0.68	0.56	0.40	0.40	1.03
Ethylbenzene	μg/m^3	0.22	0.22	0.22	0.22	0.32	0.22	0.22	0.22	0.22	0.22	0.22	0.22
p+m-Xylene	μg/m^3	0.43	0.43	0.43	0.43	1.17	0.43	0.43	0.52	0.43	0.43	0.43	0.48
o-Xylene	μg/m^3	0.22	0.22	0.22	0.22	0.37	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Styrene	μg/m^3	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Chlorobenzene	μg/m^3	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Cumene (Isopropylbenzene)	μg/m^3	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46
Total Xylenes	μg/m^3	2.60	2.60	2.60	2.60	6.07	2.60	2.60	2.60	2.60	2.60	2.60	2.60
1,1,1,2-Tetrachloroethane	μg/m^3	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14

Table E5: 2018 Monitoring Results Comparison for VOCs

St Marys Cement (1804600)

Contaminant	Units	Alt Fuel											
		3-Oct-18			10-Oct-18			11-Oct-18			12-Oct-18		
		OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
		Downwind	Background	Upwind	Background	Background	Background	Upwind	Downwind	Upwind	Upwind	Downwind	Downwind
2-Propanone	μg/m^3	7.71	4.51	0.36	25.87	6.46	13.51	6.27	3.16	5.22	3.42	3.16	8.21
Chloromethane	μg/m^3	0.97	0.97	0.62	1.01	1.01	1.05	0.97	0.93	0.95	0.95	0.93	0.97
Vinyl Chloride	μg/m^3	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Chloroethane	μg/m^3	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Methyl Ethyl Ketone (2-Butanone)	μg/m^3	0.29	0.29	0.29	0.29	0.29	2.62	2.95	2.95	2.95	2.95	2.95	0.29
cis-1,2-Dichloroethylene	μg/m^3	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
trans-1,2-Dichloroethylene	μg/m^3	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Methylene Chloride(Dichloromethane)	μg/m^3	0.41	0.38	0.17	0.45	0.43	0.48	0.41	0.39	0.37	0.46	0.39	1.10
Chloroform	μg/m^3	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Carbon Tetrachloride	μg/m^3	0.86	0.85	0.31	0.75	0.80	0.78	0.82	0.84	0.83	0.87	0.84	0.79
1,1-Dichloroethane	μg/m^3	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
1,2-Dichloroethane	μg/m^3	0.06	0.06	0.04	0.06	0.05	0.06	0.07	0.06	0.06	0.06	0.06	0.07
Ethylene Dibromide	μg/m^3	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
1,1,1-Trichloroethane	μg/m^3	0.33	0.33	0.33	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
1,1,2-Trichloroethane	μg/m^3	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
1,1,2,2-Tetrachloroethane	μg/m^3	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
1,2-Dichloropropane	μg/m^3	0.24	0.24	0.24	0.24	0.24	0.24	0.28	0.24	0.30	0.24	0.24	0.41
Bromoform	μg/m^3	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
Bromomethane	μg/m^3	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
Bromodichloromethane	μg/m^3	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34
Dibromochloromethane	μg/m^3	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
Trichloroethylene	μg/m^3	0.32	0.32	0.32	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Tetrachloroethylene	μg/m^3	0.56	0.41	0.41	0.34	0.34	0.34	1.34	0.34	0.34	0.34	0.34	0.34
Benzene	μg/m^3	0.31	0.33	0.16	0.46	0.27	0.62	0.22	0.24	0.24	0.23	0.24	0.41
Toluene	μg/m^3	0.49	0.54	0.19	0.91	0.96	1.24	0.56	0.55	0.40	0.39	0.55	0.72
Ethylbenzene	μg/m^3	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
p+m-Xylene	μg/m^3	0.43	0.43	0.43	0.69	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
o-Xylene	μg/m^3	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Styrene	μg/m^3	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Chlorobenzene	μg/m^3	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Cumene (Isopropylbenzene)	μg/m^3	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46
Total Xylenes	μg/m^3	2.60	2.60	2.60	2.78	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
1,1,1,2-Tetrachloroethane	μg/m^3	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14

Table E5: 2018 Monitoring Results Comparison for VOCs

St Marys Cement (1804600)

Contaminant	Units	Alt Fuel									Baseline					
		4-Dec-18			5-Dec-18			6-Dec-18			7-Dec-18			8-Dec-18		
		OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
		Uwind	Background	Downwind	Background	Background	Background	Upwind	Background	Downwind	Background	Upwind	Background	Background	Background	Background
2-Propanone	μg/m^3	2.47	7.22	2.49	4.25	4.79	Unrecovered Sample	3.99	3.16	2.44	2.11	5.25	1.95	3.80	3.80	1.73
Chloromethane	μg/m^3	1.07	1.07	1.03	1.16	1.11		1.16	1.11	1.16	1.13	1.16	1.09	1.16	1.18	1.11
Vinyl Chloride	μg/m^3	0.05	0.05	0.05	0.05	0.05		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Chloroethane	μg/m^3	0.79	0.79	0.79	0.79	0.79		0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Methyl Ethyl Ketone (2-Butanone)	μg/m^3	0.80	1.21	0.68	1.41	1.30		1.41	0.88	1.80	0.68	0.83	0.56	1.09	1.06	0.77
cis-1,2-Dichloroethylene	μg/m^3	0.20	0.20	0.20	0.20	0.20		0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
trans-1,2-Dichloroethylene	μg/m^3	0.40	0.40	0.40	0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Methylene Chloride(Dichloromethane)	μg/m^3	0.59	0.57	0.54	0.61	0.66		0.63	0.53	0.64	0.60	0.67	0.47	0.67	0.52	0.53
Chloroform	μg/m^3	0.20	0.20	0.20	0.20	0.20		0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Carbon Tetrachloride	μg/m^3	0.79	0.80	0.82	0.78	0.77		0.89	0.92	0.93	0.89	0.96	0.94	0.78	0.89	0.99
1,1-Dichloroethane	μg/m^3	0.20	0.20	0.20	0.20	0.20		0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
1,2-Dichloroethane	μg/m^3	0.13	0.13	0.13	0.13	0.14		0.14	0.14	0.14	0.13	0.13	0.13	0.13	0.13	0.14
Ethylene Dibromide	μg/m^3	0.08	0.08	0.08	0.08	0.08		0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
1,1,1-Trichloroethane	μg/m^3	0.27	0.27	0.27	0.27	0.27		0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
1,1,2-Trichloroethane	μg/m^3	0.07	0.07	0.07	0.07	0.07		0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
1,1,2,2-Tetrachloroethane	μg/m^3	0.02	0.02	0.02	0.02	0.02		0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
1,2-Dichloropropane	μg/m^3	0.24	0.24	0.24	0.24	0.24		0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Bromoform	μg/m^3	0.52	0.52	0.52	0.52	0.52		0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
Bromomethane	μg/m^3	0.39	0.39	0.39	0.39	0.39		0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
Bromodichloromethane	μg/m^3	1.34	1.34	1.34	1.34	1.34		1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34
Dibromochloromethane	μg/m^3	1.70	1.70	1.70	1.70	1.70		1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
Trichloroethylene	μg/m^3	0.27	0.27	0.27	0.27	0.27		0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Tetrachloroethylene	μg/m^3	0.34	0.34	0.34	0.34	0.34		0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Benzene	μg/m^3	0.56	0.62	0.73	0.62	0.86		0.49	0.53	0.51	0.44	0.40	0.40	0.58	0.51	0.55
Toluene	μg/m^3	0.71	0.87	1.03	1.22	1.62		0.63	0.61	0.79	0.33	0.32	0.26	0.62	0.56	0.58
Ethylbenzene	μg/m^3	0.22	0.22	0.22	0.22	0.29		0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
p+m-Xylene	μg/m^3	0.43	0.56	0.48	0.56	0.91		0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
o-Xylene	μg/m^3	0.22	0.22	0.22	0.22	0.35		0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Styrene	μg/m^3	0.23	0.21	0.21	0.21	0.93		0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Chlorobenzene	μg/m^3	0.23	0.23	0.23	0.23	0.23		0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Cumene (Isopropylbenzene)	μg/m^3	2.46	2.46	2.46	2.46	2.46		2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46
Total Xylenes	μg/m^3	2.60	2.60	2.60	2.95	5.03		2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
1,1,1,2-Tetrachloroethane	μg/m^3	0.14	0.14	0.14	0.14	0.14		0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14

APPENDIX F

Table F1: Summary of Sample Flow Rate and Sample Duration for Hg

Sample Date	Condition	OPG					Cove					Beach				
		Filter ID No.	Sample Duration (min)	Flow Pre L/min	Flow Post L/min	Sample Volume (m^3)	Filter ID No.	Sample Duration (min)	Flow Pre L/min	Flow Post L/min	Sample Volume (m^3)	Filter ID No.	Sample Duration (min)	Flow Pre L/min	Flow Post L/min	Sample Volume (m^3)
September 30, 2018	Baseline	Invalid					685305292 6853505296	1333	0.99	0.99	1.3	6853505288 6853505291	1364	1.00	1.00	1.4
October 1, 2018	Baseline	6853505316 6853505315	1302	0.99	1.00	1.3	6853505295 6853505290	1390	1.00	0.99	1.4	Invalid				
October 2, 2018	Baseline	6853505309 6853505314	1422	1.00	1.00	1.4	6853505310 6853505308	1435	0.98	0.99	1.4	6853505317 6853505313	1435	0.94	0.94	1.3
October 3, 2018	Alt Fuels	7716904899 7716904894	1423	0.94	0.95	1.3	7716904901 7716904896	1409	0.99	0.99	1.4	7716904893 7716904898	1410	0.96	0.96	1.4
October 4, 2018	Baseline	685350218 685350227	1386	0.98	0.98	1.4	685350226 685350221	1367	0.99	0.99	1.4	685350219 685350224	1352	0.97	0.97	1.3
October 10, 2018	Alt Fuels	6853505225 6853505176	1401	0.92	0.97	1.3	6853505170 6853505223	1403	0.95	0.96	1.3	685350220 685350171	1402	0.97	0.98	1.4
October 11, 2018	Alt Fuels	6853505169 7716904895	1412	0.98	0.98	1.4	7716904900 6853505177	1408	0.98	0.98	1.4	6853505222 6853505168	1414	1.00	1.00	1.4
October 12, 2018	Alt Fuels	7716904902 6853505174	1430	0.98	0.95	1.4	7716904911 7716904897	1418	0.95	0.96	1.3	7716904904 7716904912	1401	0.99	0.98	1.4
December 4, 2018	Alt Fuels	7971602598 7971602593	1422	0.98	0.98	1.4	7971602592 7971602595	1423	0.99	0.98	1.4	7971602597 7971602591	1426	0.99	0.99	1.4
December 5, 2018	Alt Fuels	7971602747 7971602599	1456	0.99	1.01	1.5	7971602747 7971602599	1457	0.99	0.98	1.4	7971602594 7971602590	1455	0.99	1.00	1.4
December 6, 2018	Alt Fuels	7971602744 7971602742	1355	1.01	1.00	1.4	7971602748 7971602746	1355	1.00	1.05	1.4	7971602743 7971602740	1095	0.98	0.99	1.1
December 7, 2018	Baseline	7971602543 7971602546	1329	0.99	0.99	1.3	7971602749 7971602741	1352	1.00	1.00	1.3	7971602547 7971602542	1366	0.99	0.98	1.3
December 8, 2018	Baseline	7971602544 7971602549	1439	1.00	0.99	1.4	7971602540 7971602545	1424	0.99	0.99	1.4	7971602541 7971602548	1416	1.02	1.05	1.5

Table F2: 2018 OPG Station Monitoring Results for Mercury

Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	30-Sep-18	1-Oct-18	2-Oct-18	3-Oct-18	4-Oct-18	10-Oct-18	11-Oct-18	12-Oct-18	4-Dec-18	5-Dec-18	6-Dec-18	7-Dec-18	8-Dec-18
Mercury	($\mu g/m^3$)	2.000	-	Invalid	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002

NOTE: All non-detectable results

Table F2: 2018 OPG Station Monitoring Results for Mercur y

Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	MECP Criteria ($\mu g/m^3$)	No. > Criteria	Geometric Mean	Arithmetic Mean	Minimum Concentration	Maximum Concentration	Number of Valid Samples	% Valid data
Mercury	($\mu g/m^3$)	2.000	-	*2*	0	0.002	0.002	0.002	0.002	12	92

Table F3: 2018 Cove Station Monitoring Results for Mercury

Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	30-Sep-18	1-Oct-18	2-Oct-18	3-Oct-18	4-Oct-18	10-Oct-18	11-Oct-18	12-Oct-18	4-Dec-18	5-Dec-18	6-Dec-18	7-Dec-18	8-Dec-18
Mercury	($\mu g/m^3$)	2.000	-	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002	0.002

NOTE: All non-detectable results

Table F3: 2018 Cove Station Monitoring Results for Mercury

Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	MECP Criteria ($\mu g/m^3$)	No. > Criteria	Geometric Mean	Arithmetic Mean	Minimum Concentration	Maximum Concentration	Number of Valid Samples	% Valid data
Mercury	($\mu g/m^3$)	2.000	-	*2*	0	0.002	0.002	0.002	0.003	13	100

Table F4: 2018 Beach Station Monitoring Results for Mercury

Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	30-Sep-18	1-Oct-18	2-Oct-18	3-Oct-18	4-Oct-18	10-Oct-18	11-Oct-18	12-Oct-18	4-Dec-18	5-Dec-18	6-Dec-18	7-Dec-18	8-Dec-18
Mercury	($\mu g/m^3$)	2.000	-	0.002	Invalid	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.002

NOTE: All non-detectable results

Table F4: 2018 Beach Station Monitoring Results for Mercury

Contaminant	MECP Criteria (µg/m^3)	No. > Criteria	Geometric Mean	Arithmetic Mean	Minimum Concentration	Maximum Concentration	Number of Valid Samples	% Valid data
Mercury	*2*	0	0.002	0.002	0.002	0.003	12	92

Table F5: 2018 OPG Station Monitoring Results for Mercury

				Baseline											
				30-Sep-18			1-Oct-18			2-Oct-18			4-Oct-18		
Contaminant	Units	MECP Criteria	HHRA Health Based Criteria	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
Mercury	(μg/m^3)	2.000	-	Invalid	0.002	0.002	0.002	0.002	Invalid	0.002	0.002	0.002	0.002	0.002	0.002

Table F5: 2018 OPG Station Monitoring Results for Mercury

	Alt Fuel											
	3-Oct-18			10-Oct-18			11-Oct-18			12-Oct-18		
Contaminant	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
Mercury	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.002

Table F5: 2018 OPG Station Monitoring Results for Mercury

	Alt Fuel									Baseline					
	4-Dec-18			5-Dec-18			6-Dec-18			7-Dec-18			8-Dec-18		
Contaminant	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach	OPG	Cove	Beach
Mercury	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002	0.002	0.002

APPENDIX G

Your P.O. #: 1804600
Your Project #: 1804600
Site Location: ST MARYS AMBIENT
Your C.O.C. #: na

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/10/29
Report #: R5461495
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8Q4522
Received: 2018/10/06, 10:40

Sample Matrix: Filter
Samples Received: 15

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Mercury	15	2018/10/26	2018/10/29	BRL SOP-00104	EPA 7470A m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total Cover Pages : 1

Maxxam Job #: B8Q4522
Report Date: 2018/10/29

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

ELEMENTS BY ATOMIC SPECTROSCOPY (FILTER)

Maxxam ID		HYO791	HYO792	HYO793			
Sampling Date		2018/09/30	2018/09/30	2018/09/30			
COC Number		na	na	na			
	UNITS	**OPG-SEPTEMBER 30 (2 SAMPLES)**	**COVE-SEPTEMBER 30 (2 SAMPLES)**	**BEACH-SEPTEMBER 30 (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
Acid Extractable Mercury (Hg)	ug	ND	ND	ND	0.0025	0.0002	5804687

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Maxxam ID		HYO794	HYO795	HYO796			
Sampling Date		2018/10/01	2018/10/01	2018/10/01			
COC Number		na	na	na			
	UNITS	**OPG-OCTOBER 01 (2 SAMPLES)**	**COVE-OCTOBER 01 (2 SAMPLES)**	**BEACH-OCTOBER 01 (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
Acid Extractable Mercury (Hg)	ug	ND	ND	ND	0.0025	0.0002	5804687

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Maxxam ID		HYO797	HYO798	HYO799			
Sampling Date		2018/10/02	2018/10/02	2018/10/02			
COC Number		na	na	na			
	UNITS	**OPG-OCTOBER 02 (2 SAMPLES)**	**COVE-OCTOBER 02 (2 SAMPLES)**	**BEACH-OCTOBER 02 (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
Acid Extractable Mercury (Hg)	ug	ND	ND	ND	0.0025	0.0002	5804687

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Maxxam ID		HYO800	HYO801	HYO802			
Sampling Date		2018/10/03	2018/10/03	2018/10/03			
COC Number		na	na	na			
	UNITS	**OPG-OCTOBER 03 (2 SAMPLES)**	**COVE-OCTOBER 03 (2 SAMPLES)**	**BEACH-OCTOBER 03 (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
Acid Extractable Mercury (Hg)	ug	0.0031	ND	0.0032	0.0025	0.0002	5804687

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B8Q4522
Report Date: 2018/10/29

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

ELEMENTS BY ATOMIC SPECTROSCOPY (FILTER)

Maxxam ID		HYO803	HYO804	HYO805			
Sampling Date		2018/10/04	2018/10/04	2018/10/04			
COC Number		na	na	na			
	UNITS	**OPG-OCTOBER 04 (2 SAMPLES)**	**COVE-OCTOBER 04 (2 SAMPLES)**	**BEACH-OCTOBER 04 (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
Acid Extractable Mercury (Hg)	ug	ND	ND	ND	0.0025	0.0002	5804687

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B8Q4522
Report Date: 2018/10/29

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

TEST SUMMARY

Maxxam ID: HYO791 **Collected:** 2018/09/30
Sample ID: OPG-SEPTEMBER 30 (2 SAMPLES) **Shipped:**
Matrix: Filter **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5804687	2018/10/26	2018/10/29	Walt Wang

Maxxam ID: HYO792 **Collected:** 2018/09/30
Sample ID: COVE-SEPTEMBER 30 (2 SAMPLES) **Shipped:**
Matrix: Filter **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5804687	2018/10/26	2018/10/29	Walt Wang

Maxxam ID: HYO793 **Collected:** 2018/09/30
Sample ID: BEACH-SEPTEMBER 30 (2 SAMPLES) **Shipped:**
Matrix: Filter **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5804687	2018/10/26	2018/10/29	Walt Wang

Maxxam ID: HYO794 **Collected:** 2018/10/01
Sample ID: OPG-OCTOBER 01 (2 SAMPLES) **Shipped:**
Matrix: Filter **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5804687	2018/10/26	2018/10/29	Walt Wang

Maxxam ID: HYO795 **Collected:** 2018/10/01
Sample ID: COVE-OCTOBER 01 (2 SAMPLES) **Shipped:**
Matrix: Filter **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5804687	2018/10/26	2018/10/29	Walt Wang

Maxxam ID: HYO796 **Collected:** 2018/10/01
Sample ID: BEACH-OCTOBER 01 (2 SAMPLES) **Shipped:**
Matrix: Filter **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5804687	2018/10/26	2018/10/29	Walt Wang

Maxxam ID: HYO797 **Collected:** 2018/10/02
Sample ID: OPG-OCTOBER 02 (2 SAMPLES) **Shipped:**
Matrix: Filter **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5804687	2018/10/26	2018/10/29	Walt Wang

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Maxxam Job #: B8Q4522
Report Date: 2018/10/29

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

TEST SUMMARY

Maxxam ID: HYO798 **Collected:** 2018/10/02
Sample ID: COVE-OCTOBER 02 (2 SAMPLES) **Shipped:**
Matrix: Filter **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5804687	2018/10/26	2018/10/29	Walt Wang

Maxxam ID: HYO798 Dup **Collected:** 2018/10/02
Sample ID: COVE-OCTOBER 02 (2 SAMPLES) **Shipped:**
Matrix: Filter **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5804687	2018/10/26	2018/10/29	Walt Wang

Maxxam ID: HYO799 **Collected:** 2018/10/02
Sample ID: BEACH-OCTOBER 02 (2 SAMPLES) **Shipped:**
Matrix: Filter **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5804687	2018/10/26	2018/10/29	Walt Wang

Maxxam ID: HYO800 **Collected:** 2018/10/03
Sample ID: OPG-OCTOBER 03 (2 SAMPLES) **Shipped:**
Matrix: Filter **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5804687	2018/10/26	2018/10/29	Walt Wang

Maxxam ID: HYO801 **Collected:** 2018/10/03
Sample ID: COVE-OCTOBER 03 (2 SAMPLES) **Shipped:**
Matrix: Filter **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5804687	2018/10/26	2018/10/29	Walt Wang

Maxxam ID: HYO802 **Collected:** 2018/10/03
Sample ID: BEACH-OCTOBER 03 (2 SAMPLES) **Shipped:**
Matrix: Filter **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5804687	2018/10/26	2018/10/29	Walt Wang

Maxxam ID: HYO803 **Collected:** 2018/10/04
Sample ID: OPG-OCTOBER 04 (2 SAMPLES) **Shipped:**
Matrix: Filter **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5804687	2018/10/26	2018/10/29	Walt Wang

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Maxxam Job #: B8Q4522
Report Date: 2018/10/29

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

TEST SUMMARY

Maxxam ID: HYO804
Sample ID: COVE-OCTOBER 04 (2 SAMPLES)
Matrix: Filter

Collected: 2018/10/04
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5804687	2018/10/26	2018/10/29	Walt Wang

Maxxam ID: HYO805
Sample ID: BEACH-OCTOBER 04 (2 SAMPLES)
Matrix: Filter

Collected: 2018/10/04
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5804687	2018/10/26	2018/10/29	Walt Wang

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GENERAL COMMENTS

Results relate only to the items tested.

Maxxam Job #: B8Q4522
Report Date: 2018/10/29

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5804687	YCH	Spiked Blank	Acid Extractable Mercury (Hg)	2018/10/29		98	%	90 - 110
5804687	YCH	RPD	Acid Extractable Mercury (Hg)	2018/10/29	2.4		%	20
5804687	YCH	Method Blank	Acid Extractable Mercury (Hg)	2018/10/29	ND, RDL=0.0025		ug	
5804687	YCH	RPD - Sample/Sample Dup	Acid Extractable Mercury (Hg)	2018/10/29	NC		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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Maxxam Job #: B8Q4522
Report Date: 2018/10/29

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Walt Wang, Supervisor, Inorganics

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Chain of Custody Form - AIR

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CAM FCD-01302 /2 Page ____ of ____

ANALYSIS REQUESTED: NIOSH Method 6009 (Hg)

CLIENT INFORMATION SECTION

Company Name: RWDI
Project Manager: Kirk Easto
e-mail: kirk.easto@rwdi.com
Address: 600 Southgate Dr. Gielph, ON

Phone: (519) 823-1311 Fax:

Sampled by: JDF

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time	NIOSH Method 6009 (Hg)
OPG - September 30 (2 samples)		1L/M	2018/09/30	24 hrs	x
Cove - September 30 (2 samples)		1L/M	2018/09/30	24 hrs	x
Beach - September 30 (2 samples)		1L/M	2018/09/30	24 hrs	x
OPG - October 1 (2 samples)		1L/M	2018/10/01	24 hrs	x
Cove - October 01 (2 samples)		1L/M	2018/10/01	24 hrs	x
Beach - October 01 (2 samples)		1L/M	2018/10/01	24 hrs	x
OPG - October 02 (2 samples)		1L/M	2018/10/02	24 hrs	x
Cove - October 02 (2 samples)		1L/M	2018/10/02	24 hrs	x
Beach - October 02 (2 samples)		1L/M	2018/10/02	24 hrs	x
OPG - October 03 (2 samples)		1L/M	2018/10/03	24 hrs	x
Cove - October 03 (2 samples)		1L/M	2018/10/03	24 hrs	x
Beach - October 03 (2 samples)		1L/M	2018/10/03	24 hrs	x

06-Oct-18 10:40
Clayton Johnson
B8Q4522
DSG AIR-001

TAT Requirement

STD 10 Business day ☑
Rush 5 Business day * ☐
Rush 2 Business day * ☐
* need approval from Maxxam

PROJECT INFORMATION

Project #: 1804600
Name: St Marys Ambient
PO #: 1804600
Maxxam Quote #:
Maxxam Contact:

REPORTING REQUIREMENTS

Summary Report only ☐
EDD ☐
Regulation

Notes

Please note if this samples are "Industrial Hygiene" samples

PROJECT SPECIFIC COMMENTS

Client Signature: Joe Frost
Affiliation: Env Tech
Date/Time: 2018/10/05

Received by: Dipika Singh DIPIKA SINGH
Affiliation: Maxxam
Date/Time: 2018/10/06 10:40

14/14/14 ICE PACK

Chain of Custody Form - AIR

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CAM FCD-01302 /2   Page ____ of ____

ANALYSIS REQUESTED: NIOSH Method 6009 (Hg)

CLIENT INFORMATION SECTION

Company Name: RWDI
Project Manager: Kirk Easto
e-mail: kirk.easto@rwdi.com
Address: 600 Southgate Dr. Gielph, ON
Phone: (519) 823-1311   Fax:
Sampled by: JDF

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time	NIOSH Method 6009 (Hg)
OPG - October 4 (2 samples)		1L/M	2018/10/04	24 hrs	x
Cove - October 4 (2 samples)		1L/M	2018/10/04	24 hrs	x
Beach - October 4 (2 samples)		1L/M	2018/10/04	24 hrs	x

TAT Requirement

STD 10 Business day ☑
Rush 5 Business day * ☐
Rush 2 Business day * ☐
* need approval from Maxxam

PROJECT INFORMATION

Project #: 1804600
Name: St Marys Ambient
PO #: 1804600
Maxxam Quote #:
Maxxam Contact:

REPORTING REQUIREMENTS

Summary Report only ☐
EDD ☐
Regulation

Notes

Please note if this samples are "Industrial Hygiene" samples

PROJECT SPECIFIC COMMENTS

Client Signature: Joe Frost
Affiliation: Env Tech
Date/Time: 2018/10/05

Received by: Dipik Singh DIPIKASINGH
Affiliation: Maxxam
Date/Time: 2018/10/06 10:40

14|14|14 ICE PACK

Your P.O. #: 1804600
Your Project #: 1804600
Site Location: ST MARYS AMBIENT
Your C.O.C. #: na

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/10/29
Report #: R5461501
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8R3580
Received: 2018/10/15, 15:21

Sample Matrix: AIR
Samples Received: 10

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Mercury	10	2018/10/26	2018/10/29	BRL SOP-00104	EPA 7470A m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769
==
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Maxxam Job #: B8R3580
Report Date: 2018/10/29

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

ELEMENTS BY ATOMIC SPECTROSCOPY (AIR)

Maxxam ID		IAP742	IAP743	IAP744			
Sampling Date		2018/10/10	2018/10/10	2018/10/10			
COC Number		na	na	na			
	UNITS	**OPG-OCTOBER10 (2 SAMPLES)**	**COVE-OCTOBER10 (2 SAMPLES)**	**BEACH-OCTOBER10 (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
Acid Extractable Mercury (Hg)	ug	ND	ND	ND	0.0025	0.0002	5804690

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Maxxam ID		IAP745	IAP746	IAP747			
Sampling Date		2018/10/11	2018/10/11	2018/10/11			
COC Number		na	na	na			
	UNITS	**OPG-OCTOBER11 (2 SAMPLES)**	**COVE-OCTOBER11 (2 SAMPLES)**	**BEACH-OCTOBER11 (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
Acid Extractable Mercury (Hg)	ug	ND	0.0025	ND	0.0025	0.0002	5804690

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Maxxam ID		IAP748	IAP749	IAP750			
Sampling Date		2018/10/12	2018/10/12	2018/10/12			
COC Number		na	na	na			
	UNITS	**OPG-OCTOBER12 (2 SAMPLES)**	**COVE-OCTOBER12 (2 SAMPLES)**	**BEACH-OCTOBER12 (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
Acid Extractable Mercury (Hg)	ug	ND	0.0035	0.0032	0.0025	0.0002	5804690

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Maxxam ID		IAP751			
Sampling Date					
COC Number		na			
	UNITS	**HG TUBES-BLANK**	**RDL**	**MDL**	**QC Batch**
Acid Extractable Mercury (Hg)	ug	ND	0.0025	0.0002	5804690

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B8R3580
Report Date: 2018/10/29

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

TEST SUMMARY

Maxxam ID: IAP742
Sample ID: OPG-OCTOBER10 (2 SAMPLES)
Matrix: AIR

Collected: 2018/10/10
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5804690	2018/10/26	2018/10/29	Meghaben Patel

Maxxam ID: IAP743
Sample ID: COVE-OCTOBER10 (2 SAMPLES)
Matrix: AIR

Collected: 2018/10/10
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5804690	2018/10/26	2018/10/29	Meghaben Patel

Maxxam ID: IAP744
Sample ID: BEACH-OCTOBER10 (2 SAMPLES)
Matrix: AIR

Collected: 2018/10/10
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5804690	2018/10/26	2018/10/29	Meghaben Patel

Maxxam ID: IAP745
Sample ID: OPG-OCTOBER11 (2 SAMPLES)
Matrix: AIR

Collected: 2018/10/11
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5804690	2018/10/26	2018/10/29	Meghaben Patel

Maxxam ID: IAP745 Dup
Sample ID: OPG-OCTOBER11 (2 SAMPLES)
Matrix: AIR

Collected: 2018/10/11
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5804690	2018/10/26	2018/10/29	Meghaben Patel

Maxxam ID: IAP746
Sample ID: COVE-OCTOBER11 (2 SAMPLES)
Matrix: AIR

Collected: 2018/10/11
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5804690	2018/10/26	2018/10/29	Meghaben Patel

Maxxam ID: IAP747
Sample ID: BEACH-OCTOBER11 (2 SAMPLES)
Matrix: AIR

Collected: 2018/10/11
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5804690	2018/10/26	2018/10/29	Meghaben Patel

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Maxxam Job #: B8R3580
Report Date: 2018/10/29

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

TEST SUMMARY

Maxxam ID: IAP748 **Collected:** 2018/10/12
Sample ID: OPG-OCTOBER12 (2 SAMPLES) **Shipped:**
Matrix: AIR **Received:** 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5804690	2018/10/26	2018/10/29	Meghaben Patel

Maxxam ID: IAP749 **Collected:** 2018/10/12
Sample ID: COVE-OCTOBER12 (2 SAMPLES) **Shipped:**
Matrix: AIR **Received:** 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5804690	2018/10/26	2018/10/29	Meghaben Patel

Maxxam ID: IAP750 **Collected:** 2018/10/12
Sample ID: BEACH-OCTOBER12 (2 SAMPLES) **Shipped:**
Matrix: AIR **Received:** 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5804690	2018/10/26	2018/10/29	Meghaben Patel

Maxxam ID: IAP751 **Collected:**
Sample ID: HG TUBES-BLANK **Shipped:**
Matrix: AIR **Received:** 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5804690	2018/10/26	2018/10/29	Meghaben Patel

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GENERAL COMMENTS

Results relate only to the items tested.

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Maxxam Job #: B8R3580
Report Date: 2018/10/29

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5804690	MPD	Spiked Blank	Acid Extractable Mercury (Hg)	2018/10/29		99	%	90 - 110
5804690	MPD	RPD	Acid Extractable Mercury (Hg)	2018/10/29	1.7		%	20
5804690	MPD	Method Blank	Acid Extractable Mercury (Hg)	2018/10/29	ND, RDL=0.0025		ug	
5804690	MPD	RPD - Sample/Sample Dup	Acid Extractable Mercury (Hg)	2018/10/29	3.9		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

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Maxxam Job #: B8R3580
Report Date: 2018/10/29

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Walt Wang, Supervisor, Inorganics

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Chain of Custody Form - AIR

Maxxam
A Bureau Veritas Group Company

6740 Campobello Rd
Mississauga Ontario ,L5N 2L8
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Phone: (905) 817-5700
Fax: (905) 817-5777

CAM FCD-01302 /2 Page ___ of ___

ANALYSIS REQUESTED

15-Oct-18 15:21
Clayton Johnson
B8R3580
J L AIR-FRIDGE

CLIENT INFORMATION SECTION

Company Name: RWDI
Project Manager: Kirk Easto
e-mail: kirk.easto@rwdi.com
Address: 600 Southgate Dr. Gielph, ON
Phone: (519) 823-1311 Fax:
Sampled by: JDF

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time	NIOSH Method 6009 (Hg)
OPG - October 10 (2 samples)		1L/M	2018/10/10	24 hrs	x
Cove - October 10 (2 samples)		1L/M	2018/10/10	24 hrs	x
Beach - October 10 (2 samples)		1L/M	2018/10/10	24 hrs	x
OPG - October 11 (2 samples)		1L/M	2018/10/11	24 hrs	x
Cove - October 11 (2 samples)		1L/M	2018/10/11	24 hrs	x
Beach - October 11 (2 samples)		1L/M	2018/10/11	24 hrs	x
OPG - October 12 (2 samples)		1L/M	2018/10/12	24 hrs	x
Cove - October 12 (2 samples)		1L/M	2018/10/12	24 hrs	x
Beach - October 12 (2 samples)		1L/M	2018/10/12	24 hrs	x
Hg Tubes - BLANK					x

TAT Requirement

STD 10 Business day ☑
Rush 5 Business day * ☐
Rush 2 Business day * ☐
* need approval from Maxxam

PROJECT INFORMATION

Project #: 1804600
Name: St Marys Ambient
PO #: 1804600
Maxxam Quote #:
Maxxam Contact:

REPORTING REQUIREMENTS

Summary Report only ☐
EDD ☐
Regulation ________

Notes

Please note if this samples are "Industrial Hygiene" samples

PROJECT SPECIFIC COMMENTS

Client Signature: Joe Frost
Affiliation: Env Tech
Date/Time: 2018/10/15

Received by: [signature]
Affiliation:
Date/Time: 2018/10/15 15:21

Site Location: ST. MARYS
Your C.O.C. #: na

Attention: Kirk Easto
RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/12/21
Report #: R5535425
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8W9990
Received: 2018/12/10, 10:21

Sample Matrix: Charcoal Tubes
Samples Received: 16

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Mercury	16	2018/12/19	2018/12/20	BRL SOP-00104	EPA 7470A m

Remarks:

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All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

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Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769
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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B8W9990
Report Date: 2018/12/21

RWDI Air Inc
Site Location: ST. MARYS

ELEMENTS BY ATOMIC SPECTROSCOPY (CHARCOAL TUBES)

Maxxam ID		INA395	INA396	INA397			
Sampling Date		2018/12/04	2018/12/04	2018/12/04			
COC Number		na	na	na			
	UNITS	**OPG-DEC04-HG TUBES (2 SAMPLES)**	**BEACH-DEC04-HG TUBES (2 SAMPLES)**	**COVE-DEC04-HG TUBES (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
Acid Extractable Mercury (Hg)	ug	ND	0.0028	0.0025	0.0025	0.0002	5896382

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Maxxam ID		INA398	INA399	INA400			
Sampling Date		2018/12/05	2018/12/05	2018/12/05			
COC Number		na	na	na			
	UNITS	**OPG-DEC05-HG TUBES (2 SAMPLES)**	**BEACH-DEC05-HG TUBES (2 SAMPLES)**	**COVE-DEC05-HG TUBES (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
Acid Extractable Mercury (Hg)	ug	0.0031	0.0032	0.0030	0.0025	0.0002	5896382

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		INA401	INA402	INA403			
Sampling Date		2018/12/06	2018/12/06	2018/12/06			
COC Number		na	na	na			
	UNITS	**OPG-DEC06-HG TUBES (2 SAMPLES)**	**COVE-DEC06-HG TUBES (2 SAMPLES)**	**BEACH-DEC06-HG TUBES (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
Acid Extractable Mercury (Hg)	ug	0.0025	ND	0.0033	0.0025	0.0002	5896382

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Maxxam ID		INA404	INA405	INA406			
Sampling Date		2018/12/07	2018/12/07	2018/12/07			
COC Number		na	na	na			
	UNITS	**OPG-DEC07-HG TUBES (2 SAMPLES)**	**COVE-DEC07-HG TUBES (2 SAMPLES)**	**BEACH-DEC07-HG TUBES (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
Acid Extractable Mercury (Hg)	ug	ND	0.0033	ND	0.0025	0.0002	5896382

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B8W9990
Report Date: 2018/12/21

RWDI Air Inc
Site Location: ST. MARYS

ELEMENTS BY ATOMIC SPECTROSCOPY (CHARCOAL TUBES)

Maxxam ID		INA407	INA408	INA409			
Sampling Date		2018/12/08	2018/12/08	2018/12/08			
COC Number		na	na	na			
	UNITS	**OPG-DEC08-HG TUBES (2 SAMPLES)**	**COVE-DEC08-HG TUBES (2 SAMPLES)**	**BEACH-DEC08-HG TUBES (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
Acid Extractable Mercury (Hg)	ug	ND	ND	0.0031	0.0025	0.0002	5896382

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Maxxam ID		INA410			
Sampling Date					
COC Number		na			
	UNITS	**BLANK-HG TUBES (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
Acid Extractable Mercury (Hg)	ug	ND	0.0025	0.0002	5896382

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B8W9990
Report Date: 2018/12/21

RWDI Air Inc
Site Location: ST. MARYS

TEST SUMMARY

Maxxam ID: INA395
Sample ID: OPG-DEC04-HG TUBES (2 SAMPLES)
Matrix: Charcoal Tubes

Collected: 2018/12/04
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5896382	2018/12/19	2018/12/20	Meghaben Patel

Maxxam ID: INA396
Sample ID: BEACH-DEC04-HG TUBES (2 SAMPLES)
Matrix: Charcoal Tubes

Collected: 2018/12/04
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5896382	2018/12/19	2018/12/20	Meghaben Patel

Maxxam ID: INA397
Sample ID: COVE-DEC04-HG TUBES (2 SAMPLES)
Matrix: Charcoal Tubes

Collected: 2018/12/04
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5896382	2018/12/19	2018/12/20	Meghaben Patel

Maxxam ID: INA398
Sample ID: OPG-DEC05-HG TUBES (2 SAMPLES)
Matrix: Charcoal Tubes

Collected: 2018/12/05
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5896382	2018/12/19	2018/12/20	Meghaben Patel

Maxxam ID: INA399
Sample ID: BEACH-DEC05-HG TUBES (2 SAMPLES)
Matrix: Charcoal Tubes

Collected: 2018/12/05
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5896382	2018/12/19	2018/12/20	Meghaben Patel

Maxxam ID: INA400
Sample ID: COVE-DEC05-HG TUBES (2 SAMPLES)
Matrix: Charcoal Tubes

Collected: 2018/12/05
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5896382	2018/12/19	2018/12/20	Meghaben Patel

Maxxam ID: INA401
Sample ID: OPG-DEC06-HG TUBES (2 SAMPLES)
Matrix: Charcoal Tubes

Collected: 2018/12/06
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5896382	2018/12/19	2018/12/20	Meghaben Patel

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Maxxam Job #: B8W9990
Report Date: 2018/12/21

RWDI Air Inc
Site Location: ST. MARYS

TEST SUMMARY

Maxxam ID: INA402 **Collected:** 2018/12/06
Sample ID: COVE-DEC06-HG TUBES (2 SAMPLES) **Shipped:**
Matrix: Charcoal Tubes **Received:** 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5896382	2018/12/19	2018/12/20	Meghaben Patel

Maxxam ID: INA403 **Collected:** 2018/12/06
Sample ID: BEACH-DEC06-HG TUBES (2 SAMPLES) **Shipped:**
Matrix: Charcoal Tubes **Received:** 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5896382	2018/12/19	2018/12/20	Meghaben Patel

Maxxam ID: INA404 **Collected:** 2018/12/07
Sample ID: OPG-DEC07-HG TUBES (2 SAMPLES) **Shipped:**
Matrix: Charcoal Tubes **Received:** 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5896382	2018/12/19	2018/12/20	Meghaben Patel

Maxxam ID: INA405 **Collected:** 2018/12/07
Sample ID: COVE-DEC07-HG TUBES (2 SAMPLES) **Shipped:**
Matrix: Charcoal Tubes **Received:** 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5896382	2018/12/19	2018/12/20	Meghaben Patel

Maxxam ID: INA406 **Collected:** 2018/12/07
Sample ID: BEACH-DEC07-HG TUBES (2 SAMPLES) **Shipped:**
Matrix: Charcoal Tubes **Received:** 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5896382	2018/12/19	2018/12/20	Meghaben Patel

Maxxam ID: INA407 **Collected:** 2018/12/08
Sample ID: OPG-DEC08-HG TUBES (2 SAMPLES) **Shipped:**
Matrix: Charcoal Tubes **Received:** 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5896382	2018/12/19	2018/12/20	Meghaben Patel

Maxxam ID: INA408 **Collected:** 2018/12/08
Sample ID: COVE-DEC08-HG TUBES (2 SAMPLES) **Shipped:**
Matrix: Charcoal Tubes **Received:** 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5896382	2018/12/19	2018/12/20	Meghaben Patel

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Maxxam Job #: B8W9990
Report Date: 2018/12/21

RWDI Air Inc
Site Location: ST. MARYS

TEST SUMMARY

Maxxam ID: INA409
Sample ID: BEACH-DEC08-HG TUBES (2 SAMPLES)
Matrix: Charcoal Tubes

Collected: 2018/12/08
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5896382	2018/12/19	2018/12/20	Meghaben Patel

Maxxam ID: INA410
Sample ID: BLANK-HG TUBES (2 SAMPLES)
Matrix: Charcoal Tubes

Collected:
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury	CV/AA	5896382	2018/12/19	2018/12/20	Meghaben Patel

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GENERAL COMMENTS

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5896382	MPD	Spiked Blank	Acid Extractable Mercury (Hg)	2018/12/20		105	%	90 - 110
5896382	MPD	RPD	Acid Extractable Mercury (Hg)	2018/12/20	0.76		%	20
5896382	MPD	Method Blank	Acid Extractable Mercury (Hg)	2018/12/20	ND, RDL=0.0025		ug	

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

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Maxxam Job #: B8W9990
Report Date: 2018/12/21

RWDI Air Inc
Site Location: ST. MARYS

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Walt Wang, Scientific Specialist – Inorganic

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Chain of Custody Form - AIR

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Fax: (905) 817-5777

CAM FCD-01302 /2

Page 3 of 11

ANALYSIS REQUESTED: NIOSH M 6009

CLIENT INFORMATION SECTION

Company Name: RWP1
Project Manager:
e-mail:
Address:
Phone: Fax:
Sampled by:

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time	NIOSH M 6009
OPG-DEC04 - Hg TUBES (2 SAMPLES)		1-0 L/M	12/04		✓
BEACH-DEC04-Hg TUBES			12/04		✓
COVE-DEC04-Hg TUBES			12/04		✓
OPG-DEC05-Hg TUBES			12/05		✓
BEACH-DEC05-Hg TUBES)			12/05		✓
COVE-DEC05 Hg TUBES			12/05		✓
OPG-DEC06- Hg TUBES			12/06		✓
COVE-DEC06 - Hg TUBES			12/06		✓
BEACH-DEC06-Hg TUBES			12/06		✓
OPG-DEC07 -Hg TUBES			12/07		✓
COVE-DEC07-Hg TUBES			12/07		✓
BEACH- D7 -Hg TUBES			12/07		✓

10-Dec-18 10:21
Clayton Johnson
B8W9990
DSG AIR-FRIDGE

TAT Requirement
STD 10 Business day ☐
Rush 5 Business day * ☐
Rush 2 Business day * ☐
* need approval from Maxxam

PROJECT INFORMATION
Project #:
Name:
PO #:
Maxxam Quote #:
Maxxam Contact:

REPORTING REQUIREMENTS
Summary Report only ☐
EDD ☐
Regulation

Notes
Please note if this samples are "Industrial Hygiene" samples
If submitting dustfall samples, please indicate the diameter of the jar opening in cm.
PROJECT SPECIFIC COMMENTS

Client Signature:
Affiliation:
Date/Time:

Received by: See Page1
Affiliation:
Date/Time:

COC-1031 (11/2017)

[illegible] 2018/12/10 10:21 17.6, 17.8, 18.2 [illegible]

Chain of Custody Form - AIR

30746

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Phone: (905) 817-5700
Fax: (905) 817-5777

CAM FCD-01302 /2

ANALYSIS REQUESTED: NIOSH M. 6009

CLIENT INFORMATION SECTION

Company Name: RWDI
Project Manager:
e-mail:
Address:
Phone: Fax:
Sampled by:

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time	NIOSH M. 6009
OPG - DEC 08 - Hg TUBES (2 SAMPLES)		1.0 L/m	12/08		✓
COVE - DEC 08 - Hg TUBES			12/08		✓
BEACH - DEC 08 - Hg TUBES			12/08		✓
BLANK Hg TUBE					✓

TAT Requirement
- STD 10 Business day ☐
- Rush 5 Business day * ☐
- Rush 2 Business day * ☐
- * need approval from Maxxam

PROJECT INFORMATION
Project #:
Name:
PO #:
Maxxam Quote #:
Maxxam Contact:

REPORTING REQUIREMENTS
Summary Report only ☐
EDD ☐
Regulation:

Notes
Please note if this samples are "Industrial Hygiene" samples
If submitting dustfall samples, please indicate the diameter of the jar opening in cm.
PROJECT SPECIFIC COMMENTS

Client Signature:
Affiliation:
Date/Time:

Received by: See Page 1
Affiliation:
Date/Time:

COC-1031 (11/2017)

Maxxam
A Bureau Veritas Group Company

Your P.O. #: 1804600
Your Project #: 1804600
Site Location: ST MARYS AMBIENT
Your C.O.C. #: na

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/10/23
Report #: R5452930
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8Q4506
Received: 2018/10/06, 10:40

Sample Matrix: Filter
Samples Received: 15

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Total Metals on Hi-Vol Filter (6010Cmod)	15	2018/10/19	2018/10/22	CAM SOP-00408	EPA 6010D m
Particulates on Filter (Method IO-3.1)	15	2018/10/16	2018/10/15	CAM SOP-00942	Method IO-3.1

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

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Your P.O. #: 1804600
Your Project #: 1804600
Site Location: ST MARYS AMBIENT
Your C.O.C. #: na

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/10/23
Report #: R5452930
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8Q4506
Received: 2018/10/06, 10:40

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B8Q4506
Report Date: 2018/10/23

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

RESULTS OF ANALYSES OF FILTER

Maxxam ID		HYO529	HYO530	HYO531	HYO532			
Sampling Date		2018/09/30	2018/09/30	2018/09/30	2018/10/01			
COC Number		na	na	na	na			
	UNITS	**OPG-SEPTEMBER 30**	**COVE-SEPTEMBER 30**	**BEACH-SEPTEMBER 30**	**OPG-OCTOBER 1**	**RDL**	**MDL**	**QC Batch**
Particulate Weight on Filter	mg	17.6	21.8	31.6	17.5	5.0	N/A	5785612

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam ID		HYO533	HYO534	HYO535	HYO536			
Sampling Date		2018/10/01	2018/10/01	2018/10/02	2018/10/02			
COC Number		na	na	na	na			
	UNITS	**COVE-OCTOBER 1**	**BEACH-OCTOBER 1**	**OPG-OCTOBER 2**	**COVE-OCTOBER 2**	**RDL**	**MDL**	**QC Batch**
Particulate Weight on Filter	mg	15.7	5.8	11.2	12.3	5.0	N/A	5785612

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam ID		HYO537	HYO538	HYO539	HYO540			
Sampling Date		2018/10/02	2018/10/03	2018/10/03	2018/10/03			
COC Number		na	na	na	na			
	UNITS	**BEACH-OCTOBER 2**	**OPG-OCTOBER 3**	**COVE-OCTOBER 3**	**BEACH-OCTOBER 3**	**RDL**	**MDL**	**QC Batch**
Particulate Weight on Filter	mg	18.3	34.2	18.3	18.1	5.0	N/A	5785612

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam ID		HYO541	HYO542	HYO543			
Sampling Date		2018/10/04	2018/10/04	2018/10/04			
COC Number		na	na	na			
	UNITS	**OPG-OCTOBER 4**	**COVE-OCTOBER 4**	**BEACH-OCTOBER 4**	**RDL**	**MDL**	**QC Batch**
Particulate Weight on Filter	mg	28.9	22.5	48.8	5.0	N/A	5785612

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B8Q4506
Report Date: 2018/10/23

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

ELEMENTS BY ICP-AES (FILTER)

Maxxam ID		HYO529	HYO530	HYO531	HYO532			
Sampling Date		2018/09/30	2018/09/30	2018/09/30	2018/10/01			
COC Number		na	na	na	na			
	UNITS	**OPG-SEPTEMBER 30**	**COVE-SEPTEMBER 30**	**BEACH-SEPTEMBER 30**	**OPG-OCTOBER 1**	**RDL**	**MDL**	**QC Batch**
Aluminum (Al)	ug	95	92	122	86	50	N/A	5792378
Antimony (Sb)	ug	ND	ND	ND	ND	10	N/A	5792378
Arsenic (As)	ug	ND	ND	ND	ND	6.0	1.2	5792378
Barium (Ba)	ug	17.1	13.4	10.5	13.7	1.0	N/A	5792378
Beryllium (Be)	ug	ND	ND	ND	ND	1.0	N/A	5792378
Boron (B)	ug	ND	ND	ND	ND	6.0	N/A	5792378
Cadmium (Cd)	ug	ND	ND	ND	ND	2.0	0.40	5792378
Calcium (Ca)	ug	1540	1460	2810	1400	50	N/A	5792378
Chromium (Cr)	ug	ND	ND	ND	8.1	5.0	0.40	5792378
Cobalt (Co)	ug	ND	ND	ND	ND	2.0	0.40	5792378
Copper (Cu)	ug	66.9	111	174	42.9	5.0	0.40	5792378
Iron (Fe)	ug	325	327	333	237	50	1.0	5792378
Lead (Pb)	ug	ND	6.0	4.6	ND	3.0	0.60	5792378
Manganese (Mn)	ug	9.5	11.1	13.9	6.4	1.0	0.20	5792378
Molybdenum (Mo)	ug	ND	3.9	7.2	ND	3.0	N/A	5792378
Nickel (Ni)	ug	ND	ND	3.3	5.4	3.0	0.60	5792378
Phosphorus (P)	ug	ND	36	31	57	25	N/A	5792378
Potassium (K)	ug	107	148	168	ND	100	N/A	5792378
Selenium (Se)	ug	ND	ND	ND	ND	10	2.0	5792378
Silver (Ag)	ug	ND	ND	ND	ND	5.0	N/A	5792378
Strontium (Sr)	ug	3.1	2.8	5.6	2.8	1.0	N/A	5792378
Thallium (Tl)	ug	ND	ND	ND	ND	10	N/A	5792378
Tin (Sn)	ug	ND	ND	ND	ND	10	N/A	5792378
Titanium (Ti)	ug	ND	ND	ND	ND	10	N/A	5792378
Vanadium (V)	ug	ND	ND	ND	ND	5.0	0.40	5792378
Zinc (Zn)	ug	107	64.5	85.5	24.5	5.0	1.0	5792378

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected

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Maxxam Job #: B8Q4506
Report Date: 2018/10/23

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

ELEMENTS BY ICP-AES (FILTER)

Maxxam ID		HYO533	HYO534	HYO535	HYO536			
Sampling Date		2018/10/01	2018/10/01	2018/10/02	2018/10/02			
COC Number		na	na	na	na			
	UNITS	**COVE-OCTOBER 1**	**BEACH-OCTOBER 1**	**OPG-OCTOBER 2**	**COVE-OCTOBER 2**	**RDL**	**MDL**	**QC Batch**
Aluminum (Al)	ug	93	ND	ND	ND	50	N/A	5792378
Antimony (Sb)	ug	ND	ND	ND	ND	10	N/A	5792378
Arsenic (As)	ug	ND	ND	ND	ND	6.0	1.2	5792378
Barium (Ba)	ug	6.1	2.7	12.4	6.2	1.0	N/A	5792378
Beryllium (Be)	ug	ND	ND	ND	ND	1.0	N/A	5792378
Boron (B)	ug	ND	ND	ND	ND	6.0	N/A	5792378
Cadmium (Cd)	ug	ND	ND	ND	ND	2.0	0.40	5792378
Calcium (Ca)	ug	1250	363	703	751	50	N/A	5792378
Chromium (Cr)	ug	ND	5.5	ND	ND	5.0	0.40	5792378
Cobalt (Co)	ug	ND	ND	ND	ND	2.0	0.40	5792378
Copper (Cu)	ug	112	65.7	122	172	5.0	0.40	5792378
Iron (Fe)	ug	290	95	201	191	50	1.0	5792378
Lead (Pb)	ug	ND	ND	ND	ND	3.0	0.60	5792378
Manganese (Mn)	ug	10.6	3.3	4.2	9.3	1.0	0.20	5792378
Molybdenum (Mo)	ug	3.1	3.2	6.6	5.8	3.0	N/A	5792378
Nickel (Ni)	ug	ND	ND	ND	ND	3.0	0.60	5792378
Phosphorus (P)	ug	27	ND	32	35	25	N/A	5792378
Potassium (K)	ug	ND	ND	ND	ND	100	N/A	5792378
Selenium (Se)	ug	ND	ND	ND	ND	10	2.0	5792378
Silver (Ag)	ug	ND	ND	ND	ND	5.0	N/A	5792378
Strontium (Sr)	ug	2.3	ND	1.5	1.3	1.0	N/A	5792378
Thallium (Tl)	ug	ND	ND	ND	ND	10	N/A	5792378
Tin (Sn)	ug	ND	ND	ND	ND	10	N/A	5792378
Titanium (Ti)	ug	ND	ND	ND	ND	10	N/A	5792378
Vanadium (V)	ug	ND	ND	ND	ND	5.0	0.40	5792378
Zinc (Zn)	ug	21.8	18.3	39.0	35.9	5.0	1.0	5792378

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

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Maxxam Job #: B8Q4506
Report Date: 2018/10/23

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

ELEMENTS BY ICP-AES (FILTER)

Maxxam ID		HYO537	HYO538	HYO539	HYO540			
Sampling Date		2018/10/02	2018/10/03	2018/10/03	2018/10/03			
COC Number		na	na	na	na			
	UNITS	**BEACH-OCTOBER 2**	**OPG-OCTOBER 3**	**COVE-OCTOBER 3**	**BEACH-OCTOBER 3**	**RDL**	**MDL**	**QC Batch**
Aluminum (Al)	ug	84	215	76	71	50	N/A	5792378
Antimony (Sb)	ug	ND	ND	ND	ND	10	N/A	5792378
Arsenic (As)	ug	ND	ND	ND	ND	6.0	1.2	5792378
Barium (Ba)	ug	5.4	12.1	6.4	10.8	1.0	N/A	5792378
Beryllium (Be)	ug	ND	ND	ND	ND	1.0	N/A	5792378
Boron (B)	ug	ND	ND	ND	ND	6.0	N/A	5792378
Cadmium (Cd)	ug	ND	ND	ND	ND	2.0	0.40	5792378
Calcium (Ca)	ug	2860	5280	1560	1390	50	N/A	5792378
Chromium (Cr)	ug	ND	ND	ND	ND	5.0	0.40	5792378
Cobalt (Co)	ug	ND	ND	ND	ND	2.0	0.40	5792378
Copper (Cu)	ug	183	108	163	120	5.0	0.40	5792378
Iron (Fe)	ug	193	370	198	202	50	1.0	5792378
Lead (Pb)	ug	ND	ND	ND	ND	3.0	0.60	5792378
Manganese (Mn)	ug	5.3	9.9	6.9	6.8	1.0	0.20	5792378
Molybdenum (Mo)	ug	7.5	5.5	5.3	4.7	3.0	N/A	5792378
Nickel (Ni)	ug	ND	3.1	ND	ND	3.0	0.60	5792378
Phosphorus (P)	ug	32	54	32	36	25	N/A	5792378
Potassium (K)	ug	109	179	ND	ND	100	N/A	5792378
Selenium (Se)	ug	ND	ND	ND	ND	10	2.0	5792378
Silver (Ag)	ug	ND	ND	ND	ND	5.0	N/A	5792378
Strontium (Sr)	ug	5.3	10.4	2.6	2.6	1.0	N/A	5792378
Thallium (Tl)	ug	ND	ND	ND	ND	10	N/A	5792378
Tin (Sn)	ug	ND	ND	ND	ND	10	N/A	5792378
Titanium (Ti)	ug	ND	ND	ND	ND	10	N/A	5792378
Vanadium (V)	ug	ND	ND	ND	ND	5.0	0.40	5792378
Zinc (Zn)	ug	23.0	30.2	26.9	34.0	5.0	1.0	5792378

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B8Q4506
Report Date: 2018/10/23

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

ELEMENTS BY ICP-AES (FILTER)

Maxxam ID		HYO541	HYO542	HYO543			
Sampling Date		2018/10/04	2018/10/04	2018/10/04			
COC Number		na	na	na			
	UNITS	**OPG-OCTOBER 4**	**COVE-OCTOBER 4**	**BEACH-OCTOBER 4**	**RDL**	**MDL**	**QC Batch**
Aluminum (Al)	ug	106	83	224	50	N/A	5792378
Antimony (Sb)	ug	ND	ND	ND	10	N/A	5792378
Arsenic (As)	ug	ND	ND	ND	6.0	1.2	5792378
Barium (Ba)	ug	13.3	6.0	6.4	1.0	N/A	5792378
Beryllium (Be)	ug	ND	ND	ND	1.0	N/A	5792378
Boron (B)	ug	ND	ND	ND	6.0	N/A	5792378
Cadmium (Cd)	ug	ND	ND	ND	2.0	0.40	5792378
Calcium (Ca)	ug	1470	1780	7750	50	N/A	5792378
Chromium (Cr)	ug	ND	ND	ND	5.0	0.40	5792378
Cobalt (Co)	ug	ND	ND	ND	2.0	0.40	5792378
Copper (Cu)	ug	87.4	87.2	61.5	5.0	0.40	5792378
Iron (Fe)	ug	287	203	426	50	1.0	5792378
Lead (Pb)	ug	ND	ND	ND	3.0	0.60	5792378
Manganese (Mn)	ug	8.8	7.2	13.3	1.0	0.20	5792378
Molybdenum (Mo)	ug	4.1	ND	ND	3.0	N/A	5792378
Nickel (Ni)	ug	ND	ND	ND	3.0	0.60	5792378
Phosphorus (P)	ug	56	43	50	25	N/A	5792378
Potassium (K)	ug	127	121	183	100	N/A	5792378
Selenium (Se)	ug	ND	ND	ND	10	2.0	5792378
Silver (Ag)	ug	ND	ND	ND	5.0	N/A	5792378
Strontium (Sr)	ug	2.8	3.3	15.2	1.0	N/A	5792378
Thallium (Tl)	ug	ND	ND	ND	10	N/A	5792378
Tin (Sn)	ug	ND	ND	ND	10	N/A	5792378
Titanium (Ti)	ug	ND	ND	ND	10	N/A	5792378
Vanadium (V)	ug	ND	ND	ND	5.0	0.40	5792378
Zinc (Zn)	ug	30.5	22.5	16.6	5.0	1.0	5792378

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected

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Maxxam Job #: B8Q4506
Report Date: 2018/10/23

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

TEST SUMMARY

Maxxam ID: HYO529 **Collected:** 2018/09/30
Sample ID: OPG-SEPTEMBER 30 **Shipped:**
Matrix: Filter **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5792378	2018/10/19	2018/10/22	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5785612	2018/10/16	2018/10/15	Violeta Porcila

Maxxam ID: HYO530 **Collected:** 2018/09/30
Sample ID: COVE-SEPTEMBER 30 **Shipped:**
Matrix: Filter **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5792378	2018/10/19	2018/10/22	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5785612	2018/10/16	2018/10/15	Violeta Porcila

Maxxam ID: HYO531 **Collected:** 2018/09/30
Sample ID: BEACH-SEPTEMBER 30 **Shipped:**
Matrix: Filter **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5792378	2018/10/19	2018/10/22	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5785612	2018/10/16	2018/10/15	Violeta Porcila

Maxxam ID: HYO532 **Collected:** 2018/10/01
Sample ID: OPG-OCTOBER 1 **Shipped:**
Matrix: Filter **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5792378	2018/10/19	2018/10/22	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5785612	2018/10/16	2018/10/15	Violeta Porcila

Maxxam ID: HYO533 **Collected:** 2018/10/01
Sample ID: COVE-OCTOBER 1 **Shipped:**
Matrix: Filter **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5792378	2018/10/19	2018/10/22	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5785612	2018/10/16	2018/10/15	Violeta Porcila

Maxxam ID: HYO534 **Collected:** 2018/10/01
Sample ID: BEACH-OCTOBER 1 **Shipped:**
Matrix: Filter **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5792378	2018/10/19	2018/10/22	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5785612	2018/10/16	2018/10/15	Violeta Porcila

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Maxxam Job #: B8Q4506
Report Date: 2018/10/23

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

TEST SUMMARY

Maxxam ID: HYO534 Dup
Sample ID: BEACH-OCTOBER 1
Matrix: Filter
Collected: 2018/10/01
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5792378	2018/10/19	2018/10/22	Archana Patel

Maxxam ID: HYO535
Sample ID: OPG-OCTOBER 2
Matrix: Filter
Collected: 2018/10/02
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5792378	2018/10/19	2018/10/22	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5785612	2018/10/16	2018/10/15	Violeta Porcila

Maxxam ID: HYO536
Sample ID: COVE-OCTOBER 2
Matrix: Filter
Collected: 2018/10/02
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5792378	2018/10/19	2018/10/22	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5785612	2018/10/16	2018/10/15	Violeta Porcila

Maxxam ID: HYO537
Sample ID: BEACH-OCTOBER 2
Matrix: Filter
Collected: 2018/10/02
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5792378	2018/10/19	2018/10/22	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5785612	2018/10/16	2018/10/15	Violeta Porcila

Maxxam ID: HYO538
Sample ID: OPG-OCTOBER 3
Matrix: Filter
Collected: 2018/10/03
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5792378	2018/10/19	2018/10/22	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5785612	2018/10/16	2018/10/15	Violeta Porcila

Maxxam ID: HYO539
Sample ID: COVE-OCTOBER 3
Matrix: Filter
Collected: 2018/10/03
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5792378	2018/10/19	2018/10/22	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5785612	2018/10/16	2018/10/15	Violeta Porcila

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Maxxam Job #: B8Q4506
Report Date: 2018/10/23

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

TEST SUMMARY

Maxxam ID: HYO540
Sample ID: BEACH-OCTOBER 3
Matrix: Filter

Collected: 2018/10/03
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5792378	2018/10/19	2018/10/22	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5785612	2018/10/16	2018/10/15	Violeta Porcila

Maxxam ID: HYO541
Sample ID: OPG-OCTOBER 4
Matrix: Filter

Collected: 2018/10/04
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5792378	2018/10/19	2018/10/22	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5785612	2018/10/16	2018/10/15	Violeta Porcila

Maxxam ID: HYO542
Sample ID: COVE-OCTOBER 4
Matrix: Filter

Collected: 2018/10/04
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5792378	2018/10/19	2018/10/22	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5785612	2018/10/16	2018/10/15	Violeta Porcila

Maxxam ID: HYO543
Sample ID: BEACH-OCTOBER 4
Matrix: Filter

Collected: 2018/10/04
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5792378	2018/10/19	2018/10/22	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5785612	2018/10/16	2018/10/15	Violeta Porcila

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GENERAL COMMENTS

Results relate only to the items tested.

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Maxxam Job #: B8Q4506
Report Date: 2018/10/23

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5792378	APT	Matrix Spike(HYO534)	Aluminum (Al)	2018/10/22		101	%	75 - 125
			Antimony (Sb)	2018/10/22		89	%	75 - 125
			Arsenic (As)	2018/10/22		102	%	75 - 125
			Barium (Ba)	2018/10/22		101	%	75 - 125
			Beryllium (Be)	2018/10/22		98	%	75 - 125
			Boron (B)	2018/10/22		98	%	75 - 125
			Cadmium (Cd)	2018/10/22		103	%	75 - 125
			Calcium (Ca)	2018/10/22		100	%	75 - 125
			Chromium (Cr)	2018/10/22		96	%	75 - 125
			Cobalt (Co)	2018/10/22		102	%	75 - 125
			Copper (Cu)	2018/10/22		96	%	75 - 125
			Iron (Fe)	2018/10/22		100	%	75 - 125
			Lead (Pb)	2018/10/22		102	%	75 - 125
			Manganese (Mn)	2018/10/22		98	%	75 - 125
			Molybdenum (Mo)	2018/10/22		96	%	75 - 125
			Nickel (Ni)	2018/10/22		100	%	75 - 125
			Phosphorus (P)	2018/10/22		101	%	75 - 125
			Potassium (K)	2018/10/22		103	%	75 - 125
			Selenium (Se)	2018/10/22		104	%	75 - 125
			Silver (Ag)	2018/10/22		95	%	75 - 125
			Strontium (Sr)	2018/10/22		100	%	75 - 125
			Thallium (Tl)	2018/10/22		101	%	75 - 125
			Tin (Sn)	2018/10/22		99	%	75 - 125
			Titanium (Ti)	2018/10/22		94	%	75 - 125
			Vanadium (V)	2018/10/22		98	%	75 - 125
			Zinc (Zn)	2018/10/22		100	%	75 - 125
5792378	APT	MS/MSD RPD	Aluminum (Al)	2018/10/22	0.099		%	20
			Antimony (Sb)	2018/10/22	3.8		%	20
			Arsenic (As)	2018/10/22	0.58		%	20
			Barium (Ba)	2018/10/22	0.50		%	20
			Beryllium (Be)	2018/10/22	0.61		%	20
			Boron (B)	2018/10/22	1.5		%	20
			Cadmium (Cd)	2018/10/22	0.48		%	20
			Calcium (Ca)	2018/10/22	1.1		%	20
			Chromium (Cr)	2018/10/22	2.2		%	20
			Cobalt (Co)	2018/10/22	0.69		%	20
			Copper (Cu)	2018/10/22	5.3		%	20
			Iron (Fe)	2018/10/22	1.6		%	20
			Lead (Pb)	2018/10/22	0.88		%	20
			Manganese (Mn)	2018/10/22	1.7		%	20
			Molybdenum (Mo)	2018/10/22	0.21		%	20
			Nickel (Ni)	2018/10/22	0.20		%	20
			Phosphorus (P)	2018/10/22	0.50		%	20
			Potassium (K)	2018/10/22	1.3		%	20
			Selenium (Se)	2018/10/22	0.77		%	20
			Silver (Ag)	2018/10/22	0.73		%	20
			Strontium (Sr)	2018/10/22	0.20		%	20
			Thallium (Tl)	2018/10/22	0.79		%	20
			Tin (Sn)	2018/10/22	0.40		%	20
			Titanium (Ti)	2018/10/22	0.43		%	20
			Vanadium (V)	2018/10/22	1.9		%	20

Maxxam Job #: B8Q4506
Report Date: 2018/10/23

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Zinc (Zn)	2018/10/22	0.50		%	20
5792378	APT	Spiked Blank	Aluminum (Al)	2018/10/22		98	%	85 - 115
			Antimony (Sb)	2018/10/22		88	%	85 - 115
			Arsenic (As)	2018/10/22		103	%	85 - 115
			Barium (Ba)	2018/10/22		100	%	85 - 115
			Beryllium (Be)	2018/10/22		99	%	85 - 115
			Boron (B)	2018/10/22		100	%	85 - 115
			Cadmium (Cd)	2018/10/22		104	%	85 - 115
			Calcium (Ca)	2018/10/22		100	%	85 - 115
			Chromium (Cr)	2018/10/22		100	%	85 - 115
			Cobalt (Co)	2018/10/22		102	%	85 - 115
			Copper (Cu)	2018/10/22		101	%	85 - 115
			Iron (Fe)	2018/10/22		102	%	85 - 115
			Lead (Pb)	2018/10/22		102	%	85 - 115
			Manganese (Mn)	2018/10/22		100	%	85 - 115
			Molybdenum (Mo)	2018/10/22		97	%	85 - 115
			Nickel (Ni)	2018/10/22		102	%	85 - 115
			Phosphorus (P)	2018/10/22		100	%	85 - 115
			Potassium (K)	2018/10/22		104	%	85 - 115
			Selenium (Se)	2018/10/22		105	%	85 - 115
			Silver (Ag)	2018/10/22		97	%	85 - 115
			Strontium (Sr)	2018/10/22		100	%	85 - 115
			Thallium (Tl)	2018/10/22		102	%	85 - 115
			Tin (Sn)	2018/10/22		100	%	85 - 115
			Titanium (Ti)	2018/10/22		95	%	85 - 115
			Vanadium (V)	2018/10/22		100	%	85 - 115
			Zinc (Zn)	2018/10/22		101	%	85 - 115
5792378	APT	RPD	Aluminum (Al)	2018/10/22	0.51		%	20
			Antimony (Sb)	2018/10/22	5.9		%	20
			Arsenic (As)	2018/10/22	0.87		%	20
			Barium (Ba)	2018/10/22	0.70		%	20
			Beryllium (Be)	2018/10/22	0.10		%	20
			Boron (B)	2018/10/22	0.10		%	20
			Cadmium (Cd)	2018/10/22	0.19		%	20
			Calcium (Ca)	2018/10/22	0.80		%	20
			Chromium (Cr)	2018/10/22	0		%	20
			Cobalt (Co)	2018/10/22	0.49		%	20
			Copper (Cu)	2018/10/22	0.59		%	20
			Iron (Fe)	2018/10/22	0.88		%	20
			Lead (Pb)	2018/10/22	0		%	20
			Manganese (Mn)	2018/10/22	0.40		%	20
			Molybdenum (Mo)	2018/10/22	0.62		%	20
			Nickel (Ni)	2018/10/22	0.098		%	20
			Phosphorus (P)	2018/10/22	0.70		%	20
			Potassium (K)	2018/10/22	0.19		%	20
			Selenium (Se)	2018/10/22	0.86		%	20
			Silver (Ag)	2018/10/22	0.10		%	20
			Strontium (Sr)	2018/10/22	0.30		%	20
			Thallium (Tl)	2018/10/22	0.20		%	20
			Tin (Sn)	2018/10/22	0.20		%	20
			Titanium (Ti)	2018/10/22	0		%	20

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Maxxam Job #: B8Q4506
Report Date: 2018/10/23

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Vanadium (V)	2018/10/22	0		%	20
			Zinc (Zn)	2018/10/22	0.20		%	20
5792378	APT	Method Blank	Aluminum (Al)	2018/10/22	ND, RDL=50		ug	
			Antimony (Sb)	2018/10/22	ND, RDL=10		ug	
			Arsenic (As)	2018/10/22	ND, RDL=6.0		ug	
			Barium (Ba)	2018/10/22	ND, RDL=1.0		ug	
			Beryllium (Be)	2018/10/22	ND, RDL=1.0		ug	
			Boron (B)	2018/10/22	ND, RDL=6.0		ug	
			Cadmium (Cd)	2018/10/22	ND, RDL=2.0		ug	
			Calcium (Ca)	2018/10/22	ND, RDL=50		ug	
			Chromium (Cr)	2018/10/22	ND, RDL=5.0		ug	
			Cobalt (Co)	2018/10/22	ND, RDL=2.0		ug	
			Copper (Cu)	2018/10/22	ND, RDL=5.0		ug	
			Iron (Fe)	2018/10/22	ND, RDL=50		ug	
			Lead (Pb)	2018/10/22	ND, RDL=3.0		ug	
			Manganese (Mn)	2018/10/22	ND, RDL=1.0		ug	
			Molybdenum (Mo)	2018/10/22	ND, RDL=3.0		ug	
			Nickel (Ni)	2018/10/22	ND, RDL=3.0		ug	
			Phosphorus (P)	2018/10/22	ND, RDL=25		ug	
			Potassium (K)	2018/10/22	ND, RDL=100		ug	
			Selenium (Se)	2018/10/22	ND, RDL=10		ug	
			Silver (Ag)	2018/10/22	ND, RDL=5.0		ug	
			Strontium (Sr)	2018/10/22	ND, RDL=1.0		ug	
			Thallium (Tl)	2018/10/22	ND, RDL=10		ug	
			Tin (Sn)	2018/10/22	ND, RDL=10		ug	
			Titanium (Ti)	2018/10/22	ND, RDL=10		ug	

Maxxam Job #: B8Q4506
Report Date: 2018/10/23

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Vanadium (V)	2018/10/22	ND, RDL=5.0		ug	
			Zinc (Zn)	2018/10/22	ND, RDL=5.0		ug	
5792378	APT	RPD - Sample/Sample Dup	Aluminum (Al)	2018/10/22	NC		%	20
			Antimony (Sb)	2018/10/22	NC		%	20
			Arsenic (As)	2018/10/22	NC		%	20
			Barium (Ba)	2018/10/22	1.8		%	20
			Beryllium (Be)	2018/10/22	NC		%	20
			Boron (B)	2018/10/22	NC		%	20
			Cadmium (Cd)	2018/10/22	NC		%	20
			Calcium (Ca)	2018/10/22	6.7		%	20
			Chromium (Cr)	2018/10/22	9.9		%	20
			Cobalt (Co)	2018/10/22	NC		%	20
			Copper (Cu)	2018/10/22	5.9		%	20
			Iron (Fe)	2018/10/22	13		%	20
			Lead (Pb)	2018/10/22	NC		%	20
			Manganese (Mn)	2018/10/22	0.96		%	20
			Molybdenum (Mo)	2018/10/22	4.9		%	20
			Nickel (Ni)	2018/10/22	NC		%	20
			Phosphorus (P)	2018/10/22	NC		%	20
			Potassium (K)	2018/10/22	NC		%	20
			Selenium (Se)	2018/10/22	NC		%	20
			Silver (Ag)	2018/10/22	NC		%	20
			Strontium (Sr)	2018/10/22	NC		%	20
			Thallium (Tl)	2018/10/22	NC		%	20
			Tin (Sn)	2018/10/22	NC		%	20
			Titanium (Ti)	2018/10/22	NC		%	20
			Vanadium (V)	2018/10/22	NC		%	20
			Zinc (Zn)	2018/10/22	12		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B8Q4506
Report Date: 2018/10/23

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Brenda Moore

Brenda Moore, Team Lead

John Bowman

John Bowman, Analyst I

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Chain of Custody Form - AIR

Maxxam
A Bureau Veritas Group Company

6740 Campobello Rd
Mississauga Ontario ,L5N 2L8
www.maxxamanalytics.com

Toll Free: 1-800-668-0639
Phone: (905) 817-5700
Fax: (905) 817-5777

CAM FCD-01302 /2 Page ____ of ____

ANALYSIS REQUESTED

CLIENT INFORMATION SECTION

Company Name: RWDI
Project Manager: Kirk Easto
e-mail: kirk.easto@rwdi.com
Address: 600 Southgate Dr. Gielph, ON
Phone: (519) 823-1311 Fax:
Sampled by: JDF

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time	US EPA Method IO2, IO3 & IO5 (Metals and TSP, see list)
OPG - September 30		40 CFM	2018/09/30	24 hrs	x
Cove - September 30		40 CFM	2018/09/30	24 hrs	x
Beach - September 30		40 CFM	2018/09/30	24 hrs	x
OPG - October 1		40 CFM	2018/10/01	24 hrs	x
Cove - October 01		40 CFM	2018/10/01	24 hrs	x
Beach - October 01		40 CFM	2018/10/01	24 hrs	x
OPG - October 02		40 CFM	2018/10/02	24 hrs	x
Cove - October 02		40 CFM	2018/10/02	24 hrs	x
Beach - October 02		40 CFM	2018/10/02	24 hrs	x
OPG - October 03		40 CFM	2018/10/03	24 hrs	x
Cove - October 03		40 CFM	2018/10/03	24 hrs	x
Beach - October 03		40 CFM	2018/10/03	24 hrs	x

06-Oct-18 10:40
Clayton Johnson
B8Q4506
DSG AIR-RmTmp

TAT Requirement

STD 10 Business day ☑
Rush 5 Business day * ☐
Rush 2 Business day * ☐
* need approval from Maxxam

PROJECT INFORMATION

Project #: 1804600
Name: St Marys Ambient
PO #: 1804600
Maxxam Quote #:
Maxxam Contact:

REPORTING REQUIREMENTS

Summary Report only ☐
EDD ☐
Regulation

Notes
Please note if this samples are "Industrial Hygiene" samples

PROJECT SPECIFIC COMMENTS
See parameter list from Kirk Easto

Client Signature: Joe Frost
Affiliation: Env Tech
Date/Time: 2018/10/05

Received by: Dipika Singh DIPIKA SINGH
Affiliation: Maxxam
Date/Time: 2018/10/06 10:40

Chain of Custody Form - AIR

Maxxam
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Mississauga Ontario ,L5N 2L8
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Fax: (905) 817-5777

CAM FCD-01302 /2 Page ____ of ____

ANALYSIS REQUESTED

CLIENT INFORMATION SECTION

Company Name: RWDI
Project Manager: Kirk Easto
e-mail: kirk.easto@rwdi.com
Address: 600 Southgate Dr. Gielph, ON
Phone: (519) 823-1311 Fax:
Sampled by: JDF

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time	US EPA Method IO2, IO3 & IO5 (Metals and TSP, see list)
OPG - October 4		40 CFM	2018/10/04	24 hrs	x
Cove - October 4		40 CFM	2018/10/04	24 hrs	x
Beach - October 4		40 CFM	2018/10/04	24 hrs	x

TAT Requirement

STD 10 Business day ☑
Rush 5 Business day * ☐
Rush 2 Business day * ☐
* need approval from Maxxam

PROJECT INFORMATION

Project #: 1804600
Name: St Marys Ambient
PO #: 1804600
Maxxam Quote #:
Maxxam Contact:

REPORTING REQUIREMENTS

Summary Report only ☐
EDD ☐
Regulation

Notes

Please note if this samples are "Industrial Hygiene" samples

PROJECT SPECIFIC COMMENTS

See parameter list from Kirk Easto

Client Signature: Joe Frost
Affiliation: Env Tech
Date/Time: 2018/10/05

Received by: Dipika Singh DIPIKA SINGH
Affiliation: Maxxam
Date/Time: 2018/10/06 10:40

Your P.O. #: 1804600
Your Project #: 1804600
Site Location: ST MARYS AMBIENT
Your C.O.C. #: na

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/10/31
Report #: R5465090
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8R3457
Received: 2018/10/15, 15:21

Sample Matrix: Filter
Samples Received: 10

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Total Metals on Hi-Vol Filter (6010Cmod)	10	2018/10/24	2018/10/26	CAM SOP-00408	EPA 6010D m
Particulates on Filter (Method IO-3.1)	10	2018/10/22	2018/10/22	CAM SOP-00942	Method IO-3.1

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam’s profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Your P.O. #: 1804600
Your Project #: 1804600
Site Location: ST MARYS AMBIENT
Your C.O.C. #: na

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/10/31
Report #: R5465090
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8R3457
Received: 2018/10/15, 15:21

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769
==
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Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B8R3457
Report Date: 2018/10/31

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

RESULTS OF ANALYSES OF FILTER

Maxxam ID		IAP091	IAP092	IAP093	IAP094			
Sampling Date		2018/10/10	2018/10/10	2018/10/10	2018/10/11			
COC Number		na	na	na	na			
	UNITS	**OPG-OCTOBER10**	**COVE-OCTOBER10**	**BEACH-OCTOBER10**	**OPG-OCTOBER11**	**RDL**	**MDL**	**QC Batch**
Particulate Weight on Filter	mg	121	30.3	31.5	48.8	5.0	N/A	5796730

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam ID		IAP095	IAP096	IAP097	IAP098			
Sampling Date		2018/10/11	2018/10/11	2018/10/12	2018/10/12			
COC Number		na	na	na	na			
	UNITS	**COVE-OCTOBER11**	**BEACH-OCTOBER11**	**OPG-OCTOBER12**	**COVE-OCTOBER12**	**RDL**	**MDL**	**QC Batch**
Particulate Weight on Filter	mg	59.4	93.5	39.8	40.5	5.0	N/A	5796730

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam ID		IAP099	IAP100			
Sampling Date		2018/10/12				
COC Number		na	na			
	UNITS	**BEACH-OCTOBER12**	**HI VOL FILTER BLANK**	**RDL**	**MDL**	**QC Batch**
Particulate Weight on Filter	mg	72.3	ND	5.0	N/A	5796730

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Maxxam Job #: B8R3457
Report Date: 2018/10/31

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

ELEMENTS BY ICP-AES (FILTER)

Maxxam ID		IAP091	IAP092	IAP093	IAP094			
Sampling Date		2018/10/10	2018/10/10	2018/10/10	2018/10/11			
COC Number		na	na	na	na			
	UNITS	**OPG-OCTOBER10**	**COVE-OCTOBER10**	**BEACH-OCTOBER10**	**OPG-OCTOBER11**	**RDL**	**MDL**	**QC Batch**
Aluminum (Al)	ug	931	153	147	236	50	N/A	5800119
Antimony (Sb)	ug	ND	ND	ND	ND	10	N/A	5800119
Arsenic (As)	ug	ND	ND	ND	ND	6.0	1.2	5800119
Barium (Ba)	ug	26.5	10.7	10.1	16.9	1.0	N/A	5800119
Beryllium (Be)	ug	ND	ND	ND	ND	1.0	N/A	5800119
Boron (B)	ug	7.8	ND	ND	ND	6.0	N/A	5800119
Cadmium (Cd)	ug	ND	ND	ND	ND	2.0	0.40	5800119
Calcium (Ca)	ug	26200	2500	2990	4280	50	N/A	5800119
Chromium (Cr)	ug	ND	ND	ND	ND	5.0	0.40	5800119
Cobalt (Co)	ug	ND	ND	ND	ND	2.0	0.40	5800119
Copper (Cu)	ug	69.2	171	77.4	48.6	5.0	0.40	5800119
Iron (Fe)	ug	1760	368	347	511	50	1.0	5800119
Lead (Pb)	ug	4.5	5.7	ND	ND	3.0	0.60	5800119
Manganese (Mn)	ug	39.8	12.5	11.9	16.4	1.0	0.20	5800119
Molybdenum (Mo)	ug	4.8	6.4	3.8	3.4	3.0	N/A	5800119
Nickel (Ni)	ug	3.3	ND	ND	3.5	3.0	0.60	5800119
Phosphorus (P)	ug	147	61	59	158	25	N/A	5800119
Potassium (K)	ug	647	168	161	284	100	N/A	5800119
Selenium (Se)	ug	ND	ND	ND	ND	10	2.0	5800119
Silver (Ag)	ug	ND	ND	ND	ND	5.0	N/A	5800119
Strontium (Sr)	ug	54.5	4.8	5.9	7.1	1.0	N/A	5800119
Thallium (Tl)	ug	ND	ND	ND	ND	10	N/A	5800119
Tin (Sn)	ug	ND	ND	ND	ND	10	N/A	5800119
Titanium (Ti)	ug	32	ND	ND	12	10	N/A	5800119
Vanadium (V)	ug	ND	ND	ND	ND	5.0	0.40	5800119
Zinc (Zn)	ug	48.2	29.0	24.3	24.4	5.0	1.0	5800119

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected

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Maxxam Job #: B8R3457
Report Date: 2018/10/31

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

ELEMENTS BY ICP-AES (FILTER)

Maxxam ID		IAP095	IAP096	IAP097		IAP098			
Sampling Date		2018/10/11	2018/10/11	2018/10/12		2018/10/12			
COC Number		na	na	na		na			
	UNITS	**COVE-OCTOBER11**	**BEACH-OCTOBER11**	**OPG-OCTOBER12**	**QC Batch**	**COVE-OCTOBER12**	**RDL**	**MDL**	**QC Batch**
Aluminum (Al)	ug	293	705	230	5800119	251	50	N/A	5800119
Antimony (Sb)	ug	ND	ND	ND	5800119	ND	10	N/A	5800119
Arsenic (As)	ug	ND	ND	ND	5800119	ND	6.0	1.2	5800119
Barium (Ba)	ug	10.0	12.1	19.0	5800119	10.3	1.0	N/A	5810614
Beryllium (Be)	ug	ND	ND	ND	5800119	ND	1.0	N/A	5800119
Boron (B)	ug	ND	ND	ND	5800119	ND	6.0	N/A	5800119
Cadmium (Cd)	ug	ND	ND	ND	5800119	ND	2.0	0.40	5800119
Calcium (Ca)	ug	9730	19800	3700	5800119	7310	50	N/A	5800119
Chromium (Cr)	ug	ND	ND	ND	5800119	5.0	5.0	0.40	5800119
Cobalt (Co)	ug	ND	ND	ND	5800119	ND	2.0	0.40	5800119
Copper (Cu)	ug	57.3	23.4	82.1	5800119	88.2	5.0	0.40	5800119
Iron (Fe)	ug	661	1240	555	5800119	557	50	1.0	5800119
Lead (Pb)	ug	ND	ND	3.5	5800119	ND	3.0	0.60	5800119
Manganese (Mn)	ug	18.3	30.3	17.3	5800119	15.9	1.0	0.20	5800119
Molybdenum (Mo)	ug	ND	ND	5.0	5800119	4.2	3.0	N/A	5800119
Nickel (Ni)	ug	3.1	3.5	ND	5800119	ND	3.0	0.60	5800119
Phosphorus (P)	ug	103	119	82	5800119	41	25	N/A	5800119
Potassium (K)	ug	292	633	239	5800119	187	100	N/A	5800119
Selenium (Se)	ug	ND	ND	ND	5800119	ND	10	2.0	5800119
Silver (Ag)	ug	ND	ND	ND	5800119	ND	5.0	N/A	5800119
Strontium (Sr)	ug	18.1	37.5	6.3	5800119	13.5	1.0	N/A	5800119
Thallium (Tl)	ug	ND	ND	ND	5800119	ND	10	N/A	5800119
Tin (Sn)	ug	ND	ND	ND	5800119	ND	10	N/A	5800119
Titanium (Ti)	ug	12	34	14	5800119	11	10	N/A	5800119
Vanadium (V)	ug	ND	ND	ND	5800119	ND	5.0	0.40	5800119
Zinc (Zn)	ug	19.5	28.9	55.0	5800119	32.9	5.0	1.0	5800119

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected

Maxxam Job #: B8R3457
Report Date: 2018/10/31

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

ELEMENTS BY ICP-AES (FILTER)

Maxxam ID		IAP099	IAP100			
Sampling Date		2018/10/12				
COC Number		na	na			
	UNITS	**BEACH-OCTOBER12**	**HI VOL FILTER BLANK**	**RDL**	**MDL**	**QC Batch**
Aluminum (Al)	ug	633	ND	50	N/A	5800119
Antimony (Sb)	ug	ND	ND	10	N/A	5800119
Arsenic (As)	ug	ND	ND	6.0	1.2	5800119
Barium (Ba)	ug	11.5	ND	1.0	N/A	5800119
Beryllium (Be)	ug	ND	ND	1.0	N/A	5800119
Boron (B)	ug	ND	ND	6.0	N/A	5800119
Cadmium (Cd)	ug	ND	ND	2.0	0.40	5800119
Calcium (Ca)	ug	16000	150	50	N/A	5800119
Chromium (Cr)	ug	5.5	ND	5.0	0.40	5800119
Cobalt (Co)	ug	ND	ND	2.0	0.40	5800119
Copper (Cu)	ug	25.3	ND	5.0	0.40	5800119
Iron (Fe)	ug	959	ND	50	1.0	5800119
Lead (Pb)	ug	3.5	ND	3.0	0.60	5800119
Manganese (Mn)	ug	26.6	ND	1.0	0.20	5800119
Molybdenum (Mo)	ug	ND	ND	3.0	N/A	5800119
Nickel (Ni)	ug	ND	ND	3.0	0.60	5800119
Phosphorus (P)	ug	61	ND	25	N/A	5800119
Potassium (K)	ug	499	ND	100	N/A	5800119
Selenium (Se)	ug	ND	ND	10	2.0	5800119
Silver (Ag)	ug	ND	ND	5.0	N/A	5800119
Strontium (Sr)	ug	31.0	ND	1.0	N/A	5800119
Thallium (Tl)	ug	ND	ND	10	N/A	5800119
Tin (Sn)	ug	ND	ND	10	N/A	5800119
Titanium (Ti)	ug	28	ND	10	N/A	5800119
Vanadium (V)	ug	ND	ND	5.0	0.40	5800119
Zinc (Zn)	ug	48.3	ND	5.0	1.0	5800119

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

Maxxam Job #: B8R3457
Report Date: 2018/10/31

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

TEST SUMMARY

Maxxam ID: IAP091
Sample ID: OPG-OCTOBER10
Matrix: Filter

Collected: 2018/10/10
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5800119	2018/10/24	2018/10/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5796730	2018/10/22	2018/10/22	Asma Khurram

Maxxam ID: IAP092
Sample ID: COVE-OCTOBER10
Matrix: Filter

Collected: 2018/10/10
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5800119	2018/10/24	2018/10/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5796730	2018/10/22	2018/10/22	Asma Khurram

Maxxam ID: IAP093
Sample ID: BEACH-OCTOBER10
Matrix: Filter

Collected: 2018/10/10
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5800119	2018/10/24	2018/10/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5796730	2018/10/22	2018/10/22	Asma Khurram

Maxxam ID: IAP094
Sample ID: OPG-OCTOBER11
Matrix: Filter

Collected: 2018/10/11
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5800119	2018/10/24	2018/10/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5796730	2018/10/22	2018/10/22	Asma Khurram

Maxxam ID: IAP095
Sample ID: COVE-OCTOBER11
Matrix: Filter

Collected: 2018/10/11
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5800119	2018/10/24	2018/10/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5796730	2018/10/22	2018/10/22	Asma Khurram

Maxxam ID: IAP096
Sample ID: BEACH-OCTOBER11
Matrix: Filter

Collected: 2018/10/11
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5800119	2018/10/24	2018/10/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5796730	2018/10/22	2018/10/22	Asma Khurram

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Maxxam Job #: B8R3457
Report Date: 2018/10/31

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

TEST SUMMARY

Maxxam ID: IAP097
Sample ID: OPG-OCTOBER12
Matrix: Filter

Collected: 2018/10/12
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5800119	2018/10/24	2018/10/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5796730	2018/10/22	2018/10/22	Asma Khurram

Maxxam ID: IAP098
Sample ID: COVE-OCTOBER12
Matrix: Filter

Collected: 2018/10/12
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5800119	2018/10/24	2018/10/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5796730	2018/10/22	2018/10/22	Asma Khurram

Maxxam ID: IAP098 Dup
Sample ID: COVE-OCTOBER12
Matrix: Filter

Collected: 2018/10/12
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5800119	2018/10/24	2018/10/26	Archana Patel

Maxxam ID: IAP099
Sample ID: BEACH-OCTOBER12
Matrix: Filter

Collected: 2018/10/12
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5800119	2018/10/24	2018/10/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5796730	2018/10/22	2018/10/22	Asma Khurram

Maxxam ID: IAP100
Sample ID: HI VOL FILTER BLANK
Matrix: Filter

Collected:
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5800119	2018/10/24	2018/10/26	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5796730	2018/10/22	2018/10/22	Asma Khurram

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GENERAL COMMENTS

Sample IAP098, Total Metals on Hi-Vol Filter (6010Cmod): Test repeated.

Results relate only to the items tested.

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Maxxam Job #: B8R3457
Report Date: 2018/10/31

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5800119	APT	Matrix Spike(IAP098)	Aluminum (Al)	2018/10/26		115	%	75 - 125
			Antimony (Sb)	2018/10/26		92	%	75 - 125
			Arsenic (As)	2018/10/26		103	%	75 - 125
			Barium (Ba)	2018/10/26		99	%	75 - 125
			Beryllium (Be)	2018/10/26		106	%	75 - 125
			Boron (B)	2018/10/26		109	%	75 - 125
			Cadmium (Cd)	2018/10/26		110	%	75 - 125
			Calcium (Ca)	2018/10/26		97	%	75 - 125
			Chromium (Cr)	2018/10/26		108	%	75 - 125
			Cobalt (Co)	2018/10/26		103	%	75 - 125
			Copper (Cu)	2018/10/26		104	%	75 - 125
			Iron (Fe)	2018/10/26		108	%	75 - 125
			Lead (Pb)	2018/10/26		104	%	75 - 125
			Manganese (Mn)	2018/10/26		105	%	75 - 125
			Molybdenum (Mo)	2018/10/26		101	%	75 - 125
			Nickel (Ni)	2018/10/26		105	%	75 - 125
			Phosphorus (P)	2018/10/26		106	%	75 - 125
			Potassium (K)	2018/10/26		105	%	75 - 125
			Selenium (Se)	2018/10/26		106	%	75 - 125
			Silver (Ag)	2018/10/26		98	%	75 - 125
			Strontium (Sr)	2018/10/26		102	%	75 - 125
			Thallium (Tl)	2018/10/26		102	%	75 - 125
			Tin (Sn)	2018/10/26		104	%	75 - 125
			Titanium (Ti)	2018/10/26		99	%	75 - 125
			Vanadium (V)	2018/10/26		104	%	75 - 125
			Zinc (Zn)	2018/10/26		103	%	75 - 125
5800119	APT	MS/MSD RPD	Aluminum (Al)	2018/10/26	0.79		%	20
			Antimony (Sb)	2018/10/26	0.11		%	20
			Arsenic (As)	2018/10/26	1.1		%	20
			Barium (Ba)	2018/10/26	1.3		%	20
			Beryllium (Be)	2018/10/26	0.86		%	20
			Boron (B)	2018/10/26	1.0		%	20
			Cadmium (Cd)	2018/10/26	1.4		%	20
			Calcium (Ca)	2018/10/26	14		%	20
			Chromium (Cr)	2018/10/26	2.0		%	20
			Cobalt (Co)	2018/10/26	1.1		%	20
			Copper (Cu)	2018/10/26	3.1		%	20
			Iron (Fe)	2018/10/26	0.092		%	20
			Lead (Pb)	2018/10/26	1.3		%	20
			Manganese (Mn)	2018/10/26	0.096		%	20
			Molybdenum (Mo)	2018/10/26	0.69		%	20
			Nickel (Ni)	2018/10/26	1.5		%	20
			Phosphorus (P)	2018/10/26	0.85		%	20
			Potassium (K)	2018/10/26	0.96		%	20
			Selenium (Se)	2018/10/26	0.47		%	20
			Silver (Ag)	2018/10/26	2.3		%	20
			Strontium (Sr)	2018/10/26	0.098		%	20
			Thallium (Tl)	2018/10/26	1.3		%	20
			Tin (Sn)	2018/10/26	1.7		%	20
			Titanium (Ti)	2018/10/26	0.81		%	20
			Vanadium (V)	2018/10/26	2.1		%	20

Maxxam Job #: B8R3457
Report Date: 2018/10/31

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Zinc (Zn)	2018/10/26	1.3		%	20
5800119	APT	Spiked Blank	Aluminum (Al)	2018/10/26		103	%	85 - 115
			Antimony (Sb)	2018/10/26		73 (1)	%	85 - 115
			Arsenic (As)	2018/10/26		101	%	85 - 115
			Barium (Ba)	2018/10/26		100	%	85 - 115
			Beryllium (Be)	2018/10/26		104	%	85 - 115
			Boron (B)	2018/10/26		108	%	85 - 115
			Cadmium (Cd)	2018/10/26		108	%	85 - 115
			Calcium (Ca)	2018/10/26		107	%	85 - 115
			Chromium (Cr)	2018/10/26		108	%	85 - 115
			Cobalt (Co)	2018/10/26		102	%	85 - 115
			Copper (Cu)	2018/10/26		104	%	85 - 115
			Iron (Fe)	2018/10/26		109	%	85 - 115
			Lead (Pb)	2018/10/26		102	%	85 - 115
			Manganese (Mn)	2018/10/26		105	%	85 - 115
			Molybdenum (Mo)	2018/10/26		100	%	85 - 115
			Nickel (Ni)	2018/10/26		103	%	85 - 115
			Phosphorus (P)	2018/10/26		104	%	85 - 115
			Potassium (K)	2018/10/26		105	%	85 - 115
			Selenium (Se)	2018/10/26		105	%	85 - 115
			Silver (Ag)	2018/10/26		96	%	85 - 115
			Strontium (Sr)	2018/10/26		101	%	85 - 115
			Thallium (Tl)	2018/10/26		101	%	85 - 115
			Tin (Sn)	2018/10/26		102	%	85 - 115
			Titanium (Ti)	2018/10/26		99	%	85 - 115
			Vanadium (V)	2018/10/26		104	%	85 - 115
			Zinc (Zn)	2018/10/26		102	%	85 - 115
5800119	APT	RPD	Aluminum (Al)	2018/10/26	2.3		%	20
			Antimony (Sb)	2018/10/26	13		%	20
			Arsenic (As)	2018/10/26	0.099		%	20
			Barium (Ba)	2018/10/26	0.60		%	20
			Beryllium (Be)	2018/10/26	0.58		%	20
			Boron (B)	2018/10/26	0.28		%	20
			Cadmium (Cd)	2018/10/26	0.74		%	20
			Calcium (Ca)	2018/10/26	0.47		%	20
			Chromium (Cr)	2018/10/26	0.47		%	20
			Cobalt (Co)	2018/10/26	0.58		%	20
			Copper (Cu)	2018/10/26	0.096		%	20
			Iron (Fe)	2018/10/26	0.74		%	20
			Lead (Pb)	2018/10/26	1.2		%	20
			Manganese (Mn)	2018/10/26	0.48		%	20
			Molybdenum (Mo)	2018/10/26	0.70		%	20
			Nickel (Ni)	2018/10/26	0.77		%	20
			Phosphorus (P)	2018/10/26	0.86		%	20
			Potassium (K)	2018/10/26	0.29		%	20
			Selenium (Se)	2018/10/26	0.29		%	20
			Silver (Ag)	2018/10/26	0.93		%	20
			Strontium (Sr)	2018/10/26	0.39		%	20
			Thallium (Tl)	2018/10/26	1.2		%	20
			Tin (Sn)	2018/10/26	0.78		%	20
			Titanium (Ti)	2018/10/26	0.20		%	20

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Maxxam Job #: B8R3457
Report Date: 2018/10/31

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Vanadium (V)	2018/10/26	0.58		%	20
			Zinc (Zn)	2018/10/26	0.88		%	20
5800119	APT	Method Blank	Aluminum (Al)	2018/10/26	ND, RDL=50		ug	
			Antimony (Sb)	2018/10/26	ND, RDL=10		ug	
			Arsenic (As)	2018/10/26	ND, RDL=6.0		ug	
			Barium (Ba)	2018/10/26	ND, RDL=1.0		ug	
			Beryllium (Be)	2018/10/26	ND, RDL=1.0		ug	
			Boron (B)	2018/10/26	ND, RDL=6.0		ug	
			Cadmium (Cd)	2018/10/26	ND, RDL=2.0		ug	
			Calcium (Ca)	2018/10/26	ND, RDL=50		ug	
			Chromium (Cr)	2018/10/26	ND, RDL=5.0		ug	
			Cobalt (Co)	2018/10/26	ND, RDL=2.0		ug	
			Copper (Cu)	2018/10/26	ND, RDL=5.0		ug	
			Iron (Fe)	2018/10/26	ND, RDL=50		ug	
			Lead (Pb)	2018/10/26	ND, RDL=3.0		ug	
			Manganese (Mn)	2018/10/26	ND, RDL=1.0		ug	
			Molybdenum (Mo)	2018/10/26	ND, RDL=3.0		ug	
			Nickel (Ni)	2018/10/26	ND, RDL=3.0		ug	
			Phosphorus (P)	2018/10/26	ND, RDL=25		ug	
			Potassium (K)	2018/10/26	ND, RDL=100		ug	
			Selenium (Se)	2018/10/26	ND, RDL=10		ug	
			Silver (Ag)	2018/10/26	ND, RDL=5.0		ug	
			Strontium (Sr)	2018/10/26	ND, RDL=1.0		ug	
			Thallium (Tl)	2018/10/26	ND, RDL=10		ug	
			Tin (Sn)	2018/10/26	ND, RDL=10		ug	
			Titanium (Ti)	2018/10/26	ND, RDL=10		ug	

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Maxxam Job #: B8R3457
Report Date: 2018/10/31

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Vanadium (V)	2018/10/26	ND, RDL=5.0		ug	
			Zinc (Zn)	2018/10/26	ND, RDL=5.0		ug	
5800119	APT	RPD - Sample/Sample Dup	Aluminum (Al)	2018/10/26	5.5		%	20
			Antimony (Sb)	2018/10/26	NC		%	20
			Arsenic (As)	2018/10/26	NC		%	20
			Beryllium (Be)	2018/10/26	NC		%	20
			Boron (B)	2018/10/26	NC		%	20
			Cadmium (Cd)	2018/10/26	NC		%	20
			Calcium (Ca)	2018/10/26	1.5		%	20
			Chromium (Cr)	2018/10/26	0.89		%	20
			Cobalt (Co)	2018/10/26	NC		%	20
			Copper (Cu)	2018/10/26	2.0		%	20
			Iron (Fe)	2018/10/26	1.3		%	20
			Lead (Pb)	2018/10/26	NC		%	20
			Manganese (Mn)	2018/10/26	1.5		%	20
			Molybdenum (Mo)	2018/10/26	1.4		%	20
			Nickel (Ni)	2018/10/26	NC		%	20
			Phosphorus (P)	2018/10/26	3.5		%	20
			Potassium (K)	2018/10/26	1.7		%	20
			Selenium (Se)	2018/10/26	NC		%	20
			Silver (Ag)	2018/10/26	NC		%	20
			Strontium (Sr)	2018/10/26	2.2		%	20
			Thallium (Tl)	2018/10/26	NC		%	20
			Tin (Sn)	2018/10/26	NC		%	20
			Titanium (Ti)	2018/10/26	4.6		%	20
			Vanadium (V)	2018/10/26	NC		%	20
			Zinc (Zn)	2018/10/26	2.8		%	20
5810614	APT	Matrix Spike	Barium (Ba)	2018/10/31		110	%	75 - 125
5810614	APT	MS/MSD RPD	Barium (Ba)	2018/10/31	7.2		%	20
5810614	APT	Spiked Blank	Barium (Ba)	2018/10/31		100	%	85 - 115
5810614	APT	RPD	Barium (Ba)	2018/10/31	1.8		%	20
5810614	APT	Method Blank	Barium (Ba)	2018/10/31	ND, RDL=1.0		ug	

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Maxxam Job #: B8R3457
Report Date: 2018/10/31

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Frank Mo, B.Sc., Inorganic Lab. Manager

John Bowman, Analyst I

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Chain of Custody Form - AIR

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CAM FCD-01302 /2 Page ____ of ____

ANALYSIS REQUESTED

CLIENT INFORMATION SECTION

Company Name: RWDI
Project Manager: Kirk Easto
e-mail: kirk.easto@rwdi.com
Address: 600 Southgate Dr. Gielph, ON

Phone: (519) 823-1311 Fax:

Sampled by: JDF

15-Oct-18 15:21
Clayton Johnson
B8R3457
J L AIR-RmTmp

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time	US EPA Method IO2, IO3 & IO5 (Metals and TSP, see list)
OPG - October 10		40 CFM	2018/10/10	24 hrs	x
Cove - October 10		40 CFM	2018/10/10	24 hrs	x
Beach - October 10		40 CFM	2018/10/10	24 hrs	x
OPG - October 11		40 CFM	2018/10/11	24 hrs	x
Cove - October 11		40 CFM	2018/10/11	24 hrs	x
Beach - October 11		40 CFM	2018/10/11	24 hrs	x
OPG - October 12		40 CFM	2018/10/12	24 hrs	x
Cove - October 12		40 CFM	2018/10/12	24 hrs	x
Beach - October 12		40 CFM	2018/10/12	24 hrs	x
Hi Vol Filter BLANK					

TAT Requirement

STD 10 Business day ☑
Rush 5 Business day * ☐
Rush 2 Business day * ☐
* need approval from Maxxam

PROJECT INFORMATION

Project #: 1804600
Name: St Marys Ambient
PO #: 1804600
Maxxam Quote #:
Maxxam Contact:

REPORTING REQUIREMENTS

Summary Report only ☐
EDD ☐
Regulation

Notes
Please note if this samples are "Industrial Hygiene" samples

PROJECT SPECIFIC COMMENTS
See parameter list from Kirk Easto

Client Signature: Joe Frost
Affiliation: Env Tech
Date/Time: 2018/10/15

Received by: [signature]
Affiliation:
Date/Time: 2018/10/15 15:21

Site Location: ST. MARYS
Your C.O.C. #: na

Attention: Kirk Easto
RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/12/21
Report #: R5536174
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8W9953
Received: 2018/12/10, 10:21

Sample Matrix: Filter
Samples Received: 16

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Total Metals on Hi-Vol Filter (6010Cmod)	16	2018/12/17	2018/12/19	CAM SOP-00408	EPA 6010D m
Particulates on Filter (Method IO-3.1)	16	2018/12/17	2018/12/17	CAM SOP-00942	Method IO-3.1

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B8W9953
Report Date: 2018/12/21

RWDI Air Inc
Site Location: ST. MARYS

RESULTS OF ANALYSES OF FILTER

Maxxam ID		INA198	INA199	INA200			
Sampling Date		2018/12/04	2018/12/04	2018/12/04			
COC Number		na	na	na			
	UNITS	**OPG-DEC04-HIVOL FILTER**	**COVE-DEC04-HIVOL FILTER**	**BEACH-DEC04-HIVOL FILTER**	**RDL**	**MDL**	**QC Batch**
Particulate Weight on Filter	mg	45.3	36.2	106	5.0	N/A	5892077

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam ID		INA201	INA202	INA203			
Sampling Date		2018/12/05	2018/12/05	2018/12/05			
COC Number		na	na	na			
	UNITS	**OPG-DEC05-HIVOL FILTER**	**COVE-DEC05-HIVOL FILTER**	**BEACH-DEC05-HIVOL FILTER**	**RDL**	**MDL**	**QC Batch**
Particulate Weight on Filter	mg	51.4	66.7	138	5.0	N/A	5892077

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam ID		INA204	INA205	INA206			
Sampling Date		2018/12/06	2018/12/06	2018/12/06			
COC Number		na	na	na			
	UNITS	**OPG-DEC06-HIVOL FILTER**	**COVE-DEC06-HIVOL FILTER**	**BEACH-DEC06-HIVOL FILTER**	**RDL**	**MDL**	**QC Batch**
Particulate Weight on Filter	mg	27.3	56.0	61.5	5.0	N/A	5892077

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam ID		INA207	INA208	INA209			
Sampling Date		2018/12/07	2018/12/07	2018/12/07			
COC Number		na	na	na			
	UNITS	**OPG-DEC07-HIVOL FILTER**	**COVE-DEC07-HIVOL FILTER**	**BEACH-DEC07-HIVOL FILTER**	**RDL**	**MDL**	**QC Batch**
Particulate Weight on Filter	mg	60.0	22.6	66.7	5.0	N/A	5892077

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B8W9953
Report Date: 2018/12/21

RWDI Air Inc
Site Location: ST. MARYS

RESULTS OF ANALYSES OF FILTER

Maxxam ID		INA210	INA211	INA212			
Sampling Date		2018/12/08	2018/12/08	2018/12/08			
COC Number		na	na	na			
	UNITS	**OPG-DEC-08-HIVOL FILTER**	**COVE-DEC-08-HIVOL FILTER**	**BEACH-DEC-08-HIVOL FILTER**	**RDL**	**MDL**	**QC Batch**
Particulate Weight on Filter	mg	47.1	20.4	46.6	5.0	N/A	5892077

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam ID		INA213			
Sampling Date					
COC Number		na			
	UNITS	**BLANK HIVOL FILTER**	**RDL**	**MDL**	**QC Batch**
Particulate Weight on Filter	mg	ND	5.0	N/A	5892077

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

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Maxxam Job #: B8W9953
Report Date: 2018/12/21

RWDI Air Inc
Site Location: ST. MARYS

ELEMENTS BY ICP-AES (FILTER)

Maxxam ID		INA198	INA199	INA200			
Sampling Date		2018/12/04	2018/12/04	2018/12/04			
COC Number		na	na	na			
	UNITS	**OPG-DEC04-HIVOL FILTER**	**COVE-DEC04-HIVOL FILTER**	**BEACH-DEC04-HIVOL FILTER**	**RDL**	**MDL**	**QC Batch**
Aluminum (Al)	ug	230	180	638	50	N/A	5892208
Antimony (Sb)	ug	ND	ND	ND	10	N/A	5892208
Arsenic (As)	ug	ND	ND	ND	6.0	1.2	5892208
Barium (Ba)	ug	36.7	23.8	26.9	1.0	N/A	5892208
Beryllium (Be)	ug	ND	ND	ND	1.0	N/A	5892208
Boron (B)	ug	ND	ND	6.1	6.0	N/A	5892208
Cadmium (Cd)	ug	ND	ND	ND	2.0	0.40	5892208
Calcium (Ca)	ug	5850	5830	25500	50	N/A	5892208
Chromium (Cr)	ug	ND	ND	ND	5.0	0.40	5892208
Cobalt (Co)	ug	ND	ND	ND	2.0	0.40	5892208
Copper (Cu)	ug	152	88.3	81.3	5.0	0.40	5892208
Iron (Fe)	ug	836	628	1310	50	1.0	5892208
Lead (Pb)	ug	ND	3.2	3.4	3.0	0.60	5892208
Manganese (Mn)	ug	19.7	14.8	34.0	1.0	0.20	5892208
Molybdenum (Mo)	ug	8.5	5.4	4.6	3.0	N/A	5892208
Nickel (Ni)	ug	ND	ND	4.4	3.0	0.60	5892208
Phosphorus (P)	ug	39	ND	52	25	N/A	5892208
Potassium (K)	ug	117	117	349	100	N/A	5892208
Selenium (Se)	ug	ND	ND	ND	10	2.0	5892208
Silver (Ag)	ug	ND	ND	ND	5.0	N/A	5892208
Strontium (Sr)	ug	11.9	10.9	46.2	1.0	N/A	5892208
Thallium (Tl)	ug	ND	ND	ND	10	N/A	5892208
Tin (Sn)	ug	ND	ND	ND	10	N/A	5892208
Titanium (Ti)	ug	22	12	18	10	N/A	5892208
Vanadium (V)	ug	ND	ND	ND	5.0	0.40	5892208
Zinc (Zn)	ug	55.0	27.9	32.6	5.0	1.0	5892208

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
ND = Not detected

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RWDI Air Inc
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ELEMENTS BY ICP-AES (FILTER)

Maxxam ID		INA201	INA202	INA203			
Sampling Date		2018/12/05	2018/12/05	2018/12/05			
COC Number		na	na	na			
	UNITS	**OPG-DEC05-HIVOL FILTER**	**COVE-DEC05-HIVOL FILTER**	**BEACH-DEC05-HIVOL FILTER**	**RDL**	**MDL**	**QC Batch**
Aluminum (Al)	ug	298	403	872	50	N/A	5892208
Antimony (Sb)	ug	ND	ND	ND	10	N/A	5892208
Arsenic (As)	ug	ND	ND	ND	6.0	1.2	5892208
Barium (Ba)	ug	37.1	26.3	30.7	1.0	N/A	5892208
Beryllium (Be)	ug	ND	ND	ND	1.0	N/A	5892208
Boron (B)	ug	ND	ND	6.0	6.0	N/A	5892208
Cadmium (Cd)	ug	ND	ND	ND	2.0	0.40	5892208
Calcium (Ca)	ug	5950	10800	24800	50	N/A	5892208
Chromium (Cr)	ug	6.3	5.2	5.6	5.0	0.40	5892208
Cobalt (Co)	ug	ND	ND	ND	2.0	0.40	5892208
Copper (Cu)	ug	77.7	63.0	32.4	5.0	0.40	5892208
Iron (Fe)	ug	996	998	1630	50	1.0	5892208
Lead (Pb)	ug	5.4	6.9	7.9	3.0	0.60	5892208
Manganese (Mn)	ug	30.5	28.9	41.6	1.0	0.20	5892208
Molybdenum (Mo)	ug	5.3	3.7	ND	3.0	N/A	5892208
Nickel (Ni)	ug	ND	3.3	3.3	3.0	0.60	5892208
Phosphorus (P)	ug	40	34	58	25	N/A	5892208
Potassium (K)	ug	131	310	842	100	N/A	5892208
Selenium (Se)	ug	ND	ND	ND	10	2.0	5892208
Silver (Ag)	ug	ND	ND	ND	5.0	N/A	5892208
Strontium (Sr)	ug	11.6	19.9	45.6	1.0	N/A	5892208
Thallium (Tl)	ug	ND	ND	ND	10	N/A	5892208
Tin (Sn)	ug	ND	ND	ND	10	N/A	5892208
Titanium (Ti)	ug	22	20	33	10	N/A	5892208
Vanadium (V)	ug	ND	ND	ND	5.0	0.40	5892208
Zinc (Zn)	ug	99.9	80.0	71.9	5.0	1.0	5892208

RDL = Reportable Detection Limit
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N/A = Not Applicable
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ELEMENTS BY ICP-AES (FILTER)

Maxxam ID		INA204	INA205	INA206			
Sampling Date		2018/12/06	2018/12/06	2018/12/06			
COC Number		na	na	na			
	UNITS	**OPG-DEC06-HIVOL FILTER**	**COVE-DEC06-HIVOL FILTER**	**BEACH-DEC06-HIVOL FILTER**	**RDL**	**MDL**	**QC Batch**
Aluminum (Al)	ug	95	317	410	50	N/A	5892208
Antimony (Sb)	ug	ND	ND	ND	10	N/A	5892208
Arsenic (As)	ug	ND	ND	ND	6.0	1.2	5892208
Barium (Ba)	ug	15.4	12.5	14.7	1.0	N/A	5892208
Beryllium (Be)	ug	ND	ND	ND	1.0	N/A	5892208
Boron (B)	ug	ND	ND	6.3	6.0	N/A	5892208
Cadmium (Cd)	ug	ND	ND	ND	2.0	0.40	5892208
Calcium (Ca)	ug	1630	8960	11400	50	N/A	5892208
Chromium (Cr)	ug	ND	ND	ND	5.0	0.40	5892208
Cobalt (Co)	ug	ND	ND	ND	2.0	0.40	5892208
Copper (Cu)	ug	56.7	31.9	18.8	5.0	0.40	5892208
Iron (Fe)	ug	385	625	659	50	1.0	5892208
Lead (Pb)	ug	ND	ND	6.1	3.0	0.60	5892208
Manganese (Mn)	ug	9.4	14.8	16.9	1.0	0.20	5892208
Molybdenum (Mo)	ug	3.5	ND	ND	3.0	N/A	5892208
Nickel (Ni)	ug	ND	ND	3.2	3.0	0.60	5892208
Phosphorus (P)	ug	ND	27	29	25	N/A	5892208
Potassium (K)	ug	ND	236	633	100	N/A	5892208
Selenium (Se)	ug	ND	ND	ND	10	2.0	5892208
Silver (Ag)	ug	ND	ND	ND	5.0	N/A	5892208
Strontium (Sr)	ug	3.7	17.1	21.4	1.0	N/A	5892208
Thallium (Tl)	ug	ND	ND	ND	10	N/A	5892208
Tin (Sn)	ug	ND	ND	ND	10	N/A	5892208
Titanium (Ti)	ug	ND	14	15	10	N/A	5892208
Vanadium (V)	ug	ND	ND	ND	5.0	0.40	5892208
Zinc (Zn)	ug	28.7	24.9	27.6	5.0	1.0	5892208

RDL = Reportable Detection Limit
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ELEMENTS BY ICP-AES (FILTER)

Maxxam ID		INA207	INA208	INA209			
Sampling Date		2018/12/07	2018/12/07	2018/12/07			
COC Number		na	na	na			
	UNITS	**OPG-DEC07-HIVOL FILTER**	**COVE-DEC07-HIVOL FILTER**	**BEACH-DEC07-HIVOL FILTER**	**RDL**	**MDL**	**QC Batch**
Aluminum (Al)	ug	194	73	342	50	N/A	5892208
Antimony (Sb)	ug	ND	ND	ND	10	N/A	5892208
Arsenic (As)	ug	ND	ND	ND	6.0	1.2	5892208
Barium (Ba)	ug	20.3	7.5	9.2	1.0	N/A	5892208
Beryllium (Be)	ug	ND	ND	ND	1.0	N/A	5892208
Boron (B)	ug	ND	ND	ND	6.0	N/A	5892208
Cadmium (Cd)	ug	ND	ND	ND	2.0	0.40	5892208
Calcium (Ca)	ug	3370	1690	12000	50	N/A	5892208
Chromium (Cr)	ug	ND	ND	ND	5.0	0.40	5892208
Cobalt (Co)	ug	ND	ND	ND	2.0	0.40	5892208
Copper (Cu)	ug	123	18.4	45.5	5.0	0.40	5892208
Iron (Fe)	ug	483	250	666	50	1.0	5892208
Lead (Pb)	ug	ND	ND	ND	3.0	0.60	5892208
Manganese (Mn)	ug	11.7	6.8	16.3	1.0	0.20	5892208
Molybdenum (Mo)	ug	4.7	ND	3.1	3.0	N/A	5892208
Nickel (Ni)	ug	ND	ND	ND	3.0	0.60	5892208
Phosphorus (P)	ug	ND	ND	28	25	N/A	5892208
Potassium (K)	ug	ND	ND	190	100	N/A	5892208
Selenium (Se)	ug	ND	ND	ND	10	2.0	5892208
Silver (Ag)	ug	ND	ND	ND	5.0	N/A	5892208
Strontium (Sr)	ug	7.4	3.4	23.5	1.0	N/A	5892208
Thallium (Tl)	ug	ND	ND	ND	10	N/A	5892208
Tin (Sn)	ug	ND	ND	ND	10	N/A	5892208
Titanium (Ti)	ug	13	ND	ND	10	N/A	5892208
Vanadium (V)	ug	ND	ND	ND	5.0	0.40	5892208
Zinc (Zn)	ug	37.5	16.6	15.2	5.0	1.0	5892208

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ND = Not detected

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ELEMENTS BY ICP-AES (FILTER)

Maxxam ID		INA210	INA211	INA212			
Sampling Date		2018/12/08	2018/12/08	2018/12/08			
COC Number		na	na	na			
	UNITS	**OPG-DEC-08-HIVOL FILTER**	**COVE-DEC-08-HIVOL FILTER**	**BEACH-DEC-08-HIVOL FILTER**	**RDL**	**MDL**	**QC Batch**
Aluminum (Al)	ug	70	54	403	50	N/A	5892208
Antimony (Sb)	ug	ND	ND	ND	10	N/A	5892208
Arsenic (As)	ug	ND	ND	ND	6.0	1.2	5892208
Barium (Ba)	ug	13.0	9.0	10.2	1.0	N/A	5892208
Beryllium (Be)	ug	ND	ND	ND	1.0	N/A	5892208
Boron (B)	ug	ND	ND	ND	6.0	N/A	5892208
Cadmium (Cd)	ug	ND	ND	ND	2.0	0.40	5892208
Calcium (Ca)	ug	1260	1170	9110	50	N/A	5892208
Chromium (Cr)	ug	ND	ND	ND	5.0	0.40	5892208
Cobalt (Co)	ug	ND	ND	ND	2.0	0.40	5892208
Copper (Cu)	ug	83.8	20.8	24.3	5.0	0.40	5892208
Iron (Fe)	ug	291	228	561	50	1.0	5892208
Lead (Pb)	ug	ND	ND	ND	3.0	0.60	5892208
Manganese (Mn)	ug	6.8	5.5	13.7	1.0	0.20	5892208
Molybdenum (Mo)	ug	4.4	ND	ND	3.0	N/A	5892208
Nickel (Ni)	ug	ND	ND	ND	3.0	0.60	5892208
Phosphorus (P)	ug	ND	ND	ND	25	N/A	5892208
Potassium (K)	ug	ND	ND	377	100	N/A	5892208
Selenium (Se)	ug	ND	ND	ND	10	2.0	5892208
Silver (Ag)	ug	ND	ND	ND	5.0	N/A	5892208
Strontium (Sr)	ug	4.4	3.0	17.7	1.0	N/A	5892208
Thallium (Tl)	ug	ND	ND	ND	10	N/A	5892208
Tin (Sn)	ug	ND	ND	ND	10	N/A	5892208
Titanium (Ti)	ug	ND	ND	21	10	N/A	5892208
Vanadium (V)	ug	ND	ND	ND	5.0	0.40	5892208
Zinc (Zn)	ug	29.1	20.0	22.3	5.0	1.0	5892208

RDL = Reportable Detection Limit
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N/A = Not Applicable
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ELEMENTS BY ICP-AES (FILTER)

Maxxam ID		INA213			
Sampling Date					
COC Number		na			
	UNITS	**BLANK HIVOL FILTER**	**RDL**	**MDL**	**QC Batch**
Aluminum (Al)	ug	ND	50	N/A	5892208
Antimony (Sb)	ug	ND	10	N/A	5892208
Arsenic (As)	ug	ND	6.0	1.2	5892208
Barium (Ba)	ug	1.5	1.0	N/A	5892208
Beryllium (Be)	ug	ND	1.0	N/A	5892208
Boron (B)	ug	ND	6.0	N/A	5892208
Cadmium (Cd)	ug	ND	2.0	0.40	5892208
Calcium (Ca)	ug	78	50	N/A	5892208
Chromium (Cr)	ug	ND	5.0	0.40	5892208
Cobalt (Co)	ug	ND	2.0	0.40	5892208
Copper (Cu)	ug	ND	5.0	0.40	5892208
Iron (Fe)	ug	ND	50	1.0	5892208
Lead (Pb)	ug	ND	3.0	0.60	5892208
Manganese (Mn)	ug	ND	1.0	0.20	5892208
Molybdenum (Mo)	ug	ND	3.0	N/A	5892208
Nickel (Ni)	ug	ND	3.0	0.60	5892208
Phosphorus (P)	ug	ND	25	N/A	5892208
Potassium (K)	ug	ND	100	N/A	5892208
Selenium (Se)	ug	ND	10	2.0	5892208
Silver (Ag)	ug	ND	5.0	N/A	5892208
Strontium (Sr)	ug	ND	1.0	N/A	5892208
Thallium (Tl)	ug	ND	10	N/A	5892208
Tin (Sn)	ug	ND	10	N/A	5892208
Titanium (Ti)	ug	ND	10	N/A	5892208
Vanadium (V)	ug	ND	5.0	0.40	5892208
Zinc (Zn)	ug	ND	5.0	1.0	5892208

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

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Maxxam Job #: B8W9953
Report Date: 2018/12/21

RWDI Air Inc
Site Location: ST. MARYS

TEST SUMMARY

Maxxam ID: INA198 **Collected:** 2018/12/04
Sample ID: OPG-DEC04-HIVOL FILTER **Shipped:**
Matrix: Filter **Received:** 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5892208	2018/12/17	2018/12/19	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5892077	2018/12/17	2018/12/17	Violeta Porcila

Maxxam ID: INA199 **Collected:** 2018/12/04
Sample ID: COVE-DEC04-HIVOL FILTER **Shipped:**
Matrix: Filter **Received:** 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5892208	2018/12/17	2018/12/19	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5892077	2018/12/17	2018/12/17	Violeta Porcila

Maxxam ID: INA200 **Collected:** 2018/12/04
Sample ID: BEACH-DEC04-HIVOL FILTER **Shipped:**
Matrix: Filter **Received:** 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5892208	2018/12/17	2018/12/19	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5892077	2018/12/17	2018/12/17	Violeta Porcila

Maxxam ID: INA201 **Collected:** 2018/12/05
Sample ID: OPG-DEC05-HIVOL FILTER **Shipped:**
Matrix: Filter **Received:** 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5892208	2018/12/17	2018/12/19	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5892077	2018/12/17	2018/12/17	Violeta Porcila

Maxxam ID: INA202 **Collected:** 2018/12/05
Sample ID: COVE-DEC05-HIVOL FILTER **Shipped:**
Matrix: Filter **Received:** 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5892208	2018/12/17	2018/12/19	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5892077	2018/12/17	2018/12/17	Violeta Porcila

Maxxam ID: INA203 **Collected:** 2018/12/05
Sample ID: BEACH-DEC05-HIVOL FILTER **Shipped:**
Matrix: Filter **Received:** 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5892208	2018/12/17	2018/12/19	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5892077	2018/12/17	2018/12/17	Violeta Porcila

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Maxxam Job #: B8W9953
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RWDI Air Inc
Site Location: ST. MARYS

TEST SUMMARY

Maxxam ID: INA204
Sample ID: OPG-DEC06-HIVOL FILTER
Matrix: Filter

Collected: 2018/12/06
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5892208	2018/12/17	2018/12/19	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5892077	2018/12/17	2018/12/17	Violeta Porcila

Maxxam ID: INA205
Sample ID: COVE-DEC06-HIVOL FILTER
Matrix: Filter

Collected: 2018/12/06
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5892208	2018/12/17	2018/12/19	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5892077	2018/12/17	2018/12/17	Violeta Porcila

Maxxam ID: INA206
Sample ID: BEACH-DEC06-HIVOL FILTER
Matrix: Filter

Collected: 2018/12/06
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5892208	2018/12/17	2018/12/19	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5892077	2018/12/17	2018/12/17	Violeta Porcila

Maxxam ID: INA207
Sample ID: OPG-DEC07-HIVOL FILTER
Matrix: Filter

Collected: 2018/12/07
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5892208	2018/12/17	2018/12/19	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5892077	2018/12/17	2018/12/17	Violeta Porcila

Maxxam ID: INA208
Sample ID: COVE-DEC07-HIVOL FILTER
Matrix: Filter

Collected: 2018/12/07
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5892208	2018/12/17	2018/12/19	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5892077	2018/12/17	2018/12/17	Violeta Porcila

Maxxam ID: INA209
Sample ID: BEACH-DEC07-HIVOL FILTER
Matrix: Filter

Collected: 2018/12/07
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5892208	2018/12/17	2018/12/19	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5892077	2018/12/17	2018/12/17	Violeta Porcila

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TEST SUMMARY

Maxxam ID: INA210
Sample ID: OPG-DEC-08-HIVOL FILTER
Matrix: Filter

Collected: 2018/12/08
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5892208	2018/12/17	2018/12/19	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5892077	2018/12/17	2018/12/17	Violeta Porcila

Maxxam ID: INA211
Sample ID: COVE-DEC-08-HIVOL FILTER
Matrix: Filter

Collected: 2018/12/08
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5892208	2018/12/17	2018/12/19	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5892077	2018/12/17	2018/12/17	Violeta Porcila

Maxxam ID: INA212
Sample ID: BEACH-DEC-08-HIVOL FILTER
Matrix: Filter

Collected: 2018/12/08
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5892208	2018/12/17	2018/12/19	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5892077	2018/12/17	2018/12/17	Violeta Porcila

Maxxam ID: INA213
Sample ID: BLANK HIVOL FILTER
Matrix: Filter

Collected:
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6010Cmod)	ICPX	5892208	2018/12/17	2018/12/19	Archana Patel
Particulates on Filter (Method IO-3.1)	BAL	5892077	2018/12/17	2018/12/17	Violeta Porcila

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GENERAL COMMENTS

Results relate only to the items tested.

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Maxxam Job #: B8W9953
Report Date: 2018/12/21

RWDI Air Inc
Site Location: ST. MARYS

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5892208	APT	Matrix Spike	Aluminum (Al)	2018/12/19		98	%	75 - 125
			Antimony (Sb)	2018/12/19		93	%	75 - 125
			Arsenic (As)	2018/12/19		98	%	75 - 125
			Barium (Ba)	2018/12/19		103	%	75 - 125
			Beryllium (Be)	2018/12/19		99	%	75 - 125
			Boron (B)	2018/12/19		97	%	75 - 125
			Cadmium (Cd)	2018/12/19		103	%	75 - 125
			Calcium (Ca)	2018/12/19		99	%	75 - 125
			Chromium (Cr)	2018/12/19		99	%	75 - 125
			Cobalt (Co)	2018/12/19		99	%	75 - 125
			Copper (Cu)	2018/12/19		98	%	75 - 125
			Iron (Fe)	2018/12/19		100	%	75 - 125
			Lead (Pb)	2018/12/19		100	%	75 - 125
			Manganese (Mn)	2018/12/19		99	%	75 - 125
			Molybdenum (Mo)	2018/12/19		99	%	75 - 125
			Nickel (Ni)	2018/12/19		99	%	75 - 125
			Phosphorus (P)	2018/12/19		105	%	75 - 125
			Potassium (K)	2018/12/19		99	%	75 - 125
			Selenium (Se)	2018/12/19		102	%	75 - 125
			Silver (Ag)	2018/12/19		99	%	75 - 125
			Strontium (Sr)	2018/12/19		99	%	75 - 125
			Thallium (Tl)	2018/12/19		98	%	75 - 125
			Tin (Sn)	2018/12/19		103	%	75 - 125
			Titanium (Ti)	2018/12/19		99	%	75 - 125
			Vanadium (V)	2018/12/19		95	%	75 - 125
			Zinc (Zn)	2018/12/19		100	%	75 - 125
5892208	APT	MS/MSD RPD	Aluminum (Al)	2018/12/19	0.82		%	20
			Antimony (Sb)	2018/12/19	5.5		%	20
			Arsenic (As)	2018/12/19	1.1		%	20
			Barium (Ba)	2018/12/19	3.2		%	20
			Beryllium (Be)	2018/12/19	0.92		%	20
			Boron (B)	2018/12/19	0.72		%	20
			Cadmium (Cd)	2018/12/19	0.68		%	20
			Calcium (Ca)	2018/12/19	0.30		%	20
			Chromium (Cr)	2018/12/19	0.71		%	20
			Cobalt (Co)	2018/12/19	0.61		%	20
			Copper (Cu)	2018/12/19	0.61		%	20
			Iron (Fe)	2018/12/19	1.8		%	20
			Lead (Pb)	2018/12/19	0.40		%	20
			Manganese (Mn)	2018/12/19	1.2		%	20
			Molybdenum (Mo)	2018/12/19	1.3		%	20
			Nickel (Ni)	2018/12/19	1.0		%	20
			Phosphorus (P)	2018/12/19	2.6		%	20
			Potassium (K)	2018/12/19	0		%	20
			Selenium (Se)	2018/12/19	1.9		%	20
			Silver (Ag)	2018/12/19	1.0		%	20
			Strontium (Sr)	2018/12/19	0.92		%	20
			Thallium (Tl)	2018/12/19	1.2		%	20
			Tin (Sn)	2018/12/19	2.5		%	20
			Titanium (Ti)	2018/12/19	1.8		%	20
			Vanadium (V)	2018/12/19	0.42		%	20
			Zinc (Zn)	2018/12/19	0.30		%	20
5892208	APT	Spiked Blank	Aluminum (Al)	2018/12/19		95	%	85 - 115
			Antimony (Sb)	2018/12/19		86	%	85 - 115
			Arsenic (As)	2018/12/19		99	%	85 - 115

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Maxxam Job #: B8W9953
Report Date: 2018/12/21

RWDI Air Inc
Site Location: ST. MARYS

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Barium (Ba)	2018/12/19		101	%	85 - 115
			Beryllium (Be)	2018/12/19		99	%	85 - 115
			Boron (B)	2018/12/19		100	%	85 - 115
			Cadmium (Cd)	2018/12/19		103	%	85 - 115
			Calcium (Ca)	2018/12/19		98	%	85 - 115
			Chromium (Cr)	2018/12/19		99	%	85 - 115
			Cobalt (Co)	2018/12/19		100	%	85 - 115
			Copper (Cu)	2018/12/19		99	%	85 - 115
			Iron (Fe)	2018/12/19		100	%	85 - 115
			Lead (Pb)	2018/12/19		100	%	85 - 115
			Manganese (Mn)	2018/12/19		98	%	85 - 115
			Molybdenum (Mo)	2018/12/19		99	%	85 - 115
			Nickel (Ni)	2018/12/19		100	%	85 - 115
			Phosphorus (P)	2018/12/19		104	%	85 - 115
			Potassium (K)	2018/12/19		99	%	85 - 115
			Selenium (Se)	2018/12/19		102	%	85 - 115
			Silver (Ag)	2018/12/19		98	%	85 - 115
			Strontium (Sr)	2018/12/19		99	%	85 - 115
			Thallium (Tl)	2018/12/19		97	%	85 - 115
			Tin (Sn)	2018/12/19		103	%	85 - 115
			Titanium (Ti)	2018/12/19		98	%	85 - 115
			Vanadium (V)	2018/12/19		95	%	85 - 115
			Zinc (Zn)	2018/12/19		100	%	85 - 115
5892208	APT	RPD	Aluminum (Al)	2018/12/19	0.64		%	20
			Antimony (Sb)	2018/12/19	11		%	20
			Arsenic (As)	2018/12/19	1.0		%	20
			Barium (Ba)	2018/12/19	1.0		%	20
			Beryllium (Be)	2018/12/19	1.2		%	20
			Boron (B)	2018/12/19	0.50		%	20
			Cadmium (Cd)	2018/12/19	0.97		%	20
			Calcium (Ca)	2018/12/19	1.2		%	20
			Chromium (Cr)	2018/12/19	1.3		%	20
			Cobalt (Co)	2018/12/19	1.3		%	20
			Copper (Cu)	2018/12/19	1.3		%	20
			Iron (Fe)	2018/12/19	1.7		%	20
			Lead (Pb)	2018/12/19	1.2		%	20
			Manganese (Mn)	2018/12/19	0.92		%	20
			Molybdenum (Mo)	2018/12/19	0.91		%	20
			Nickel (Ni)	2018/12/19	1.3		%	20
			Phosphorus (P)	2018/12/19	1.4		%	20
			Potassium (K)	2018/12/19	0		%	20
			Selenium (Se)	2018/12/19	0.20		%	20
			Silver (Ag)	2018/12/19	0.31		%	20
			Strontium (Sr)	2018/12/19	1.2		%	20
			Thallium (Tl)	2018/12/19	0.83		%	20
			Tin (Sn)	2018/12/19	1.5		%	20
			Titanium (Ti)	2018/12/19	0.82		%	20
			Vanadium (V)	2018/12/19	0.63		%	20
			Zinc (Zn)	2018/12/19	1.6		%	20
5892208	APT	Method Blank	Aluminum (Al)	2018/12/19	ND, RDL=50		ug	
			Antimony (Sb)	2018/12/19	ND, RDL=10		ug	
			Arsenic (As)	2018/12/19	ND, RDL=6.0		ug	

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Maxxam Job #: B8W9953
Report Date: 2018/12/21

RWDI Air Inc
Site Location: ST. MARYS

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Barium (Ba)	2018/12/19	ND, RDL=1.0		ug	
			Beryllium (Be)	2018/12/19	ND, RDL=1.0		ug	
			Boron (B)	2018/12/19	ND, RDL=6.0		ug	
			Cadmium (Cd)	2018/12/19	ND, RDL=2.0		ug	
			Calcium (Ca)	2018/12/19	ND, RDL=50		ug	
			Chromium (Cr)	2018/12/19	ND, RDL=5.0		ug	
			Cobalt (Co)	2018/12/19	ND, RDL=2.0		ug	
			Copper (Cu)	2018/12/19	ND, RDL=5.0		ug	
			Iron (Fe)	2018/12/19	ND, RDL=50		ug	
			Lead (Pb)	2018/12/19	ND, RDL=3.0		ug	
			Manganese (Mn)	2018/12/19	ND, RDL=1.0		ug	
			Molybdenum (Mo)	2018/12/19	ND, RDL=3.0		ug	
			Nickel (Ni)	2018/12/19	ND, RDL=3.0		ug	
			Phosphorus (P)	2018/12/19	ND, RDL=25		ug	
			Potassium (K)	2018/12/19	ND, RDL=100		ug	
			Selenium (Se)	2018/12/19	ND, RDL=10		ug	
			Silver (Ag)	2018/12/19	ND, RDL=5.0		ug	
			Strontium (Sr)	2018/12/19	ND, RDL=1.0		ug	
			Thallium (Tl)	2018/12/19	ND, RDL=10		ug	
			Tin (Sn)	2018/12/19	ND, RDL=10		ug	
			Titanium (Ti)	2018/12/19	ND, RDL=10		ug	
			Vanadium (V)	2018/12/19	ND, RDL=5.0		ug	
			Zinc (Zn)	2018/12/19	ND, RDL=5.0		ug	
5892208	APT	RPD - Sample/Sample Dup	Arsenic (As)	2018/12/19	NC		%	20
			Cadmium (Cd)	2018/12/19	NC		%	20
			Chromium (Cr)	2018/12/19	NC		%	20
			Cobalt (Co)	2018/12/19	NC		%	20
			Copper (Cu)	2018/12/19	3.6		%	20
			Iron (Fe)	2018/12/19	4.8		%	20
			Lead (Pb)	2018/12/19	NC		%	20
			Manganese (Mn)	2018/12/19	13		%	20
			Nickel (Ni)	2018/12/19	NC		%	20
			Selenium (Se)	2018/12/19	NC		%	20

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Vanadium (V)	2018/12/19	NC		%	20
			Zinc (Zn)	2018/12/19	NC		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Brenda Moore, Team Lead, Inorganic

John Bowman, Supervisor, Metals Group

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Chain of Custody Form - AIR

30747

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CAM FCD-01302 /2

Page 5 of 11

ANALYSIS REQUESTED: USEPA M 102 | USEPA M 103 | USEPA M 105

CLIENT INFORMATION SECTION

Company Name: RWDI
Project Manager:
e-mail:
Address:

Phone: Fax:

Sampled by:

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time	USEPA M 102	USEPA M 103	USEPA M 105
OPG-DEC04 - HIVOL FILTER			12/04		✓	✓	✓
COVE-DEC04-			12		✓	✓	✓
BEACH-DEC04-			↓		✓	✓	✓
OPG-DEC05 -			12/05		✓	✓	✓
COVE-DEC05 -					✓	✓	✓
BEACH-DEC05-			↓		✓	✓	✓
OPG-DEC06 -			12/06		✓	✓	✓
COVE-DEC06 -					✓	✓	✓
BEACH-DEC06-			↓		✓	✓	✓
OPG-DEC07-			12/07		✓	✓	✓
COVE-DEC07-					✓	✓	✓
BEACH-DEC07-			↓		✓	✓	✓

10-Dec-18 10:21
Clayton Johnson
B8W9953
DSG AIR-RmTmp

TAT Requirement

STD 10 Business day ☐
Rush 5 Business day * ☐
Rush 2 Business day * ☐
* need approval from Maxxam

PROJECT INFORMATION

Project #:
Name:
PO #:
Maxxam Quote #:
Maxxam Contact:

REPORTING REQUIREMENTS

Summary Report only ☐
EDD ☐

Regulation

Notes

Please note if this samples are "Industrial Hygiene" samples
If submitting dustfall samples, please indicate the diameter of the jar opening in cm.

PROJECT SPECIFIC COMMENTS

Client Signature:
Affiliation:
Date/Time:

Received by: See Page 1
Affiliation:
Date/Time: 2018/12/10 10:21

COC-1031 (11/2017)

Chain of Custody Form - AIR

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CAM FCD-01302 /2

Page 6 of 11

ANALYSIS REQUESTED

CLIENT INFORMATION SECTION

Company Name: RWPI
Project Manager:
e-mail:
Address:

Phone: Fax:

Sampled by:

Field Sample ID		Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time	USEPA M102	USEPA M103	USEPA M105
OPG-DEC-08	Hivol Filter			12/08		✓	✓	✓
Cove-DEC-08	↓			↓		✓	✓	✓
BEACH-DEC-08	↓			↓		✓	✓	✓
BLANK	↓					✓	✓	✓

TAT Requirement

STD 10 Business day ☐
Rush 5 Business day * ☐
Rush 2 Business day * ☐
* need approval from Maxxam

PROJECT INFORMATION

Project #:
Name:
PO #:
Maxxam Quote #:
Maxxam Contact:

REPORTING REQUIREMENTS

Summary Report only ☐
EDD ☐

Regulation

Notes

Please note if this samples are "Industrial Hygiene" samples

If submitting dustfall samples, please indicate the diameter of the jar opening in cm.

PROJECT SPECIFIC COMMENTS

Client Signature:
Affiliation:
Date/Time:

Received by: See Page 1
Affiliation:
Date/Time:

COC-1031 (11/2017)

Site Location: ST. MARYS
Your C.O.C. #: na

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2019/01/03
Report #: R5546533
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8X0068
Received: 2018/12/10, 10:21

Sample Matrix: PUF AND FILTER
Samples Received: 16

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Dioxins/Furans in Ambient Air (TO-9)	8	2018/12/11	2018/12/21	BRL SOP-00411	EPA TO-9 m
Dioxins/Furans in Ambient Air (TO-9)	8	2018/12/11	2018/12/22	BRL SOP-00411	EPA TO-9 m
PAHs in Ambient Air Samples by HRMS	5	2018/12/11	2018/12/17	BRL SOP-00418	CARB429 m
PAHs in Ambient Air Samples by HRMS	11	2018/12/11	2018/12/18	BRL SOP-00418	CARB429 m
PAH's in Air (CARB429mod)	11	2018/12/11	2018/12/24	BRL SOP-00201	CARB429/ARBM1/M2 m
PAH's in Air (CARB429mod)	5	2018/12/11	2018/12/25	BRL SOP-00201	CARB429/ARBM1/M2 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation

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Site Location: ST. MARYS
Your C.O.C. #: na

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2019/01/03
Report #: R5546533
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8X0068

Received: 2018/12/10, 10:21

Email: CJohnson@maxxam.ca
Phone# (905)817-5769

==

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Maxxam Job #: B8X0068
Report Date: 2019/01/03

RWDI Air Inc
Site Location: ST. MARYS

RESULTS OF ANALYSES OF PUF AND FILTER

Maxxam ID		INA803		INA804				
Sampling Date		2018/12/04		2018/12/04				
COC Number		na		na				
	UNITS	**OPG-DEC04 PUF (2 SAMPLES)**	**EDL**	**COVE-DEC04 PUF (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**QC Batch**
Benzo(a)pyrene	ug	0.0749	0.0019	0.139	0.0021	0.030	N/A	5882221
Surrogate Recovery (%)								
Benzo(a)pyrene (13C4)	%	89		77				5882221

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam ID		INA805		INA806				
Sampling Date		2018/12/04		2018/12/05				
COC Number		na		na				
	UNITS	**BEACH-DEC04 PUF (2 SAMPLES)**	**EDL**	**OPG-DEC05 PUF (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**QC Batch**
Benzo(a)pyrene	ug	0.0904	0.0029	0.0342	0.0023	0.030	N/A	5882221
Surrogate Recovery (%)								
Benzo(a)pyrene (13C4)	%	96		77				5882221

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam ID		INA807		INA808				
Sampling Date		2018/12/05		2018/12/05				
COC Number		na		na				
	UNITS	**COVE-DEC05 PUF (2 SAMPLES)**	**EDL**	**BEACH-DEC05 PUF (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**QC Batch**
Benzo(a)pyrene	ug	0.0799	0.0020	0.0573	0.0029	0.030	N/A	5882221
Surrogate Recovery (%)								
Benzo(a)pyrene (13C4)	%	66		76				5882221

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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RESULTS OF ANALYSES OF PUF AND FILTER

Maxxam ID		INA809		INA810				
Sampling Date		2018/12/06		2018/12/06				
COC Number		na		na				
	UNITS	**OPG-DEC06 PUF (2 SAMPLES)**	**EDL**	**COVE-DEC06 PUF (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**QC Batch**
Benzo(a)pyrene	ug	0.0126	0.0013	0.0148	0.0020	0.030	N/A	5882221
Surrogate Recovery (%)								
Benzo(a)pyrene (13C4)	%	81		88				5882221

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam ID		INA811		INA812				
Sampling Date		2018/12/06		2018/12/07				
COC Number		na		na				
	UNITS	**BEACH-DEC06 PUF (2 SAMPLES)**	**EDL**	**OPG-DEC07 PUF (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**QC Batch**
Benzo(a)pyrene	ug	0.0148	0.00094	0.0199	0.0017	0.030	N/A	5882221
Surrogate Recovery (%)								
Benzo(a)pyrene (13C4)	%	83		80				5882221

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam ID		INA813	INA814		INA815				
Sampling Date		2018/12/07	2018/12/07		2018/12/08				
COC Number		na	na		na				
	UNITS	**COVE-DEC07 PUF (2 SAMPLES)**	**BEACH-DEC07 PUF (2 SAMPLES)**	**EDL**	**OPG-DEC08 PUF (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**QC Batch**
Benzo(a)pyrene	ug	0.0275	0.0351	0.0014	0.0170	0.0012	0.030	N/A	5882221
Surrogate Recovery (%)									
Benzo(a)pyrene (13C4)	%	84	84		82				5882221

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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RESULTS OF ANALYSES OF PUF AND FILTER

Maxxam ID		INA816		INA817				
Sampling Date		2018/12/08		2018/12/08				
COC Number		na		na				
	UNITS	**COVE-DEC08 PUF (2 SAMPLES)**	**EDL**	**BEACH-DEC08 PUF (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**QC Batch**
Benzo(a)pyrene	ug	0.0184	0.00080	0.0151	0.0014	0.030	N/A	5882221
Surrogate Recovery (%)								
Benzo(a)pyrene (13C4)	%	101		90				5882221

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam ID		INA818				
Sampling Date						
COC Number		na				
	UNITS	**BLANK PUF (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**QC Batch**
Benzo(a)pyrene	ug	0.00090	0.00049	0.030	N/A	5882221
Surrogate Recovery (%)						
Benzo(a)pyrene (13C4)	%	104				5882221

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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SEMI-VOLATILE ORGANICS BY GC-MS (PUF AND FILTER)

Maxxam ID		INA803	INA804	INA805			
Sampling Date		2018/12/04	2018/12/04	2018/12/04			
COC Number		na	na	na			
	UNITS	**OPG-DEC04 PUF (2 SAMPLES)**	**COVE-DEC04 PUF (2 SAMPLES)**	**BEACH-DEC04 PUF (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
1-Methylnaphthalene	ug	1.50	2.04	2.07	0.15	0.030	5882215
1-Methylphenanthrene	ug	ND	0.18	ND	0.15	0.030	5882215
2-Chloronaphthalene	ug	ND	ND	ND	0.15	0.030	5882215
2-Methylanthracene	ug	ND	ND	ND	0.15	0.030	5882215
2-Methylnaphthalene	ug	2.40	3.24	3.24	0.15	0.030	5882215
3-Methylcholanthrene	ug	ND	ND	ND	3.0	0.60	5882215
7,12-Dimethylbenzo(a)anthracene	ug	ND	ND	ND	0.60	N/A	5882215
9,10-Dimethylanthracene	ug	ND	ND	ND	0.60	0.12	5882215
Acenaphthene	ug	0.180	0.270	0.180	0.075	0.030	5882215
Acenaphthylene	ug	0.450	0.630	0.390	0.075	0.030	5882215
Anthracene	ug	ND	ND	ND	0.075	0.030	5882215
Benzo(a)anthracene	ug	0.090	0.150	0.090	0.075	0.030	5882215
Benzo(a)fluorene	ug	ND	ND	ND	0.15	0.030	5882215
Benzo(b)fluoranthene	ug	0.150	0.210	0.120	0.075	0.030	5882215
Benzo(b)fluorene	ug	ND	ND	ND	0.15	0.030	5882215
Benzo(e)pyrene	ug	ND	ND	ND	0.15	0.030	5882215
Benzo(g,h,i)perylene	ug	0.090	0.120	0.090	0.075	0.030	5882215
Benzo(k)fluoranthene	ug	ND	ND	ND	0.075	0.030	5882215
Chrysene	ug	0.120	0.180	0.120	0.075	0.030	5882215
Coronene	ug	ND	ND	ND	0.15	0.030	5882215
Dibenz(a,h)anthracene	ug	ND	ND	ND	0.075	0.030	5882215
Dibenzo(a,c) anthracene + Picene	ug	ND	ND	ND	0.15	0.030	5882215
Dibenzo(a,c)anthracene	ug	ND	ND	ND	0.15	0.030	5882215
Dibenzo(a,e)pyrene	ug	ND	ND	ND	0.30	0.060	5882215
Fluoranthene	ug	0.210	0.300	0.210	0.075	0.030	5882215
Fluorene	ug	0.270	0.540	0.270	0.075	0.030	5882215
Indeno(1,2,3-cd)pyrene	ug	ND	0.090	ND	0.075	0.030	5882215
Naphthalene	ug	8.25	11.3	8.67	0.11	0.031	5882215
Perylene	ug	ND	ND	ND	0.15	0.030	5882215
Phenanthrene	ug	0.630	1.14	0.660	0.075	0.030	5882215
Picene	ug	ND	ND	ND	0.15	0.030	5882215
Pyrene	ug	0.180	0.330	0.180	0.075	0.030	5882215
Tetralin	ug	0.69	1.08	1.29	0.15	0.030	5882215

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

SEMI-VOLATILE ORGANICS BY GC-MS (PUF AND FILTER)

Maxxam ID		INA803	INA804	INA805			
Sampling Date		2018/12/04	2018/12/04	2018/12/04			
COC Number		na	na	na			
	UNITS	**OPG-DEC04 PUF (2 SAMPLES)**	**COVE-DEC04 PUF (2 SAMPLES)**	**BEACH-DEC04 PUF (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
Surrogate Recovery (%)							
D10-2-Methylnaphthalene	%	72	76	70			5882215
D10-Fluoranthene	%	90	92	82			5882215
D10-Fluorene (FS)	%	74	78	66			5882215
D10-Phenanthrene	%	80	82	74			5882215
D12-Benzo(a)anthracene	%	100	104	94			5882215
D12-Benzo(a)pyrene	%	94	104	96			5882215
D12-Benzo(b)fluoranthene	%	104	110	98			5882215
D12-Benzo(ghi)perylene	%	106	110	98			5882215
D12-Benzo(k)fluoranthene	%	122	126	112			5882215
D12-Chrysene	%	100	102	92			5882215
D12-Indeno(1,2,3-cd)pyrene	%	108	112	102			5882215
D12-Perylene	%	98	106	94			5882215
D14-Dibenzo(a,h)anthracene	%	104	106	94			5882215
D14-Terphenyl (FS)	%	84	82	76			5882215
D8-Acenaphthylene	%	72	78	70			5882215
D8-Naphthalene	%	74	78	70			5882215

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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SEMI-VOLATILE ORGANICS BY GC-MS (PUF AND FILTER)

Maxxam ID		INA806	INA807	INA808			
Sampling Date		2018/12/05	2018/12/05	2018/12/05			
COC Number		na	na	na			
	UNITS	**OPG-DEC05 PUF (2 SAMPLES)**	**COVE-DEC05 PUF (2 SAMPLES)**	**BEACH-DEC05 PUF (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
1-Methylnaphthalene	ug	1.74	2.16	2.34	0.15	0.030	5882215
1-Methylphenanthrene	ug	ND	ND	ND	0.15	0.030	5882215
2-Chloronaphthalene	ug	ND	ND	ND	0.15	0.030	5882215
2-Methylanthracene	ug	ND	ND	ND	0.15	0.030	5882215
2-Methylnaphthalene	ug	2.91	3.54	3.81	0.15	0.030	5882215
3-Methylcholanthrene	ug	ND	ND	ND	3.0	0.60	5882215
7,12-Dimethylbenzo(a)anthracene	ug	ND	ND	ND	0.60	N/A	5882215
9,10-Dimethylanthracene	ug	ND	ND	ND	0.60	0.12	5882215
Acenaphthene	ug	0.210	0.180	0.210	0.075	0.030	5882215
Acenaphthylene	ug	ND	ND	ND	0.075	0.030	5882215
Anthracene	ug	ND	ND	ND	0.075	0.030	5882215
Benzo(a)anthracene	ug	ND	ND	ND	0.075	0.030	5882215
Benzo(a)fluorene	ug	ND	ND	ND	0.15	0.030	5882215
Benzo(b)fluoranthene	ug	ND	0.090	ND	0.075	0.030	5882215
Benzo(b)fluorene	ug	ND	ND	ND	0.15	0.030	5882215
Benzo(e)pyrene	ug	ND	ND	ND	0.15	0.030	5882215
Benzo(g,h,i)perylene	ug	ND	ND	ND	0.075	0.030	5882215
Benzo(k)fluoranthene	ug	ND	ND	ND	0.075	0.030	5882215
Chrysene	ug	ND	0.090	0.090	0.075	0.030	5882215
Coronene	ug	ND	ND	ND	0.15	0.030	5882215
Dibenz(a,h)anthracene	ug	ND	ND	ND	0.075	0.030	5882215
Dibenzo(a,c) anthracene + Picene	ug	ND	ND	ND	0.15	0.030	5882215
Dibenzo(a,c)anthracene	ug	ND	ND	ND	0.15	0.030	5882215
Dibenzo(a,e)pyrene	ug	ND	ND	ND	0.30	0.060	5882215
Fluoranthene	ug	0.210	0.210	0.210	0.075	0.030	5882215
Fluorene	ug	0.300	0.330	0.330	0.075	0.030	5882215
Indeno(1,2,3-cd)pyrene	ug	ND	ND	ND	0.075	0.030	5882215
Naphthalene	ug	9.75	11.3	11.6	0.11	0.031	5882215
Perylene	ug	ND	ND	ND	0.15	0.030	5882215
Phenanthrene	ug	0.630	0.720	0.690	0.075	0.030	5882215
Picene	ug	ND	ND	ND	0.15	0.030	5882215
Pyrene	ug	0.150	0.180	0.150	0.075	0.030	5882215
Tetralin	ug	0.69	1.08	1.11	0.15	0.030	5882215

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

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Report Date: 2019/01/03

RWDI Air Inc
Site Location: ST. MARYS

SEMI-VOLATILE ORGANICS BY GC-MS (PUF AND FILTER)

Maxxam ID		INA806	INA807	INA808			
Sampling Date		2018/12/05	2018/12/05	2018/12/05			
COC Number		na	na	na			
	UNITS	**OPG-DEC05 PUF (2 SAMPLES)**	**COVE-DEC05 PUF (2 SAMPLES)**	**BEACH-DEC05 PUF (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
Surrogate Recovery (%)							
D10-2-Methylnaphthalene	%	78	56	74			5882215
D10-Fluoranthene	%	94	64	90			5882215
D10-Fluorene (FS)	%	74	54	76			5882215
D10-Phenanthrene	%	84	58	80			5882215
D12-Benzo(a)anthracene	%	104	74	98			5882215
D12-Benzo(a)pyrene	%	96	72	96			5882215
D12-Benzo(b)fluoranthene	%	110	78	104			5882215
D12-Benzo(ghi)perylene	%	110	78	104			5882215
D12-Benzo(k)fluoranthene	%	126	88	118			5882215
D12-Chrysene	%	104	74	96			5882215
D12-Indeno(1,2,3-cd)pyrene	%	112	80	106			5882215
D12-Perylene	%	104	74	96			5882215
D14-Dibenzo(a,h)anthracene	%	110	78	102			5882215
D14-Terphenyl (FS)	%	86	58	84			5882215
D8-Acenaphthylene	%	76	56	74			5882215
D8-Naphthalene	%	78	58	74			5882215

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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SEMI-VOLATILE ORGANICS BY GC-MS (PUF AND FILTER)

Maxxam ID		INA809	INA810	INA811			
Sampling Date		2018/12/06	2018/12/06	2018/12/06			
COC Number		na	na	na			
	UNITS	**OPG-DEC06 PUF (2 SAMPLES)**	**COVE-DEC06 PUF (2 SAMPLES)**	**BEACH-DEC06 PUF (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
1-Methylnaphthalene	ug	0.93	0.96	0.84	0.15	0.030	5882215
1-Methylphenanthrene	ug	ND	ND	ND	0.15	0.030	5882215
2-Chloronaphthalene	ug	ND	ND	ND	0.15	0.030	5882215
2-Methylanthracene	ug	ND	ND	ND	0.15	0.030	5882215
2-Methylnaphthalene	ug	1.53	1.53	1.32	0.15	0.030	5882215
3-Methylcholanthrene	ug	ND	ND	ND	3.0	0.60	5882215
7,12-Dimethylbenzo(a)anthracene	ug	ND	ND	ND	0.60	N/A	5882215
9,10-Dimethylanthracene	ug	ND	ND	ND	0.60	0.12	5882215
Acenaphthene	ug	0.150	0.120	0.120	0.075	0.030	5882215
Acenaphthylene	ug	ND	ND	ND	0.075	0.030	5882215
Anthracene	ug	ND	ND	ND	0.075	0.030	5882215
Benzo(a)anthracene	ug	ND	ND	ND	0.075	0.030	5882215
Benzo(a)fluorene	ug	ND	ND	ND	0.15	0.030	5882215
Benzo(b)fluoranthene	ug	ND	ND	ND	0.075	0.030	5882215
Benzo(b)fluorene	ug	ND	ND	ND	0.15	0.030	5882215
Benzo(e)pyrene	ug	ND	ND	ND	0.15	0.030	5882215
Benzo(g,h,i)perylene	ug	ND	ND	ND	0.075	0.030	5882215
Benzo(k)fluoranthene	ug	ND	ND	ND	0.075	0.030	5882215
Chrysene	ug	ND	ND	ND	0.075	0.030	5882215
Coronene	ug	ND	ND	ND	0.15	0.030	5882215
Dibenz(a,h)anthracene	ug	ND	ND	ND	0.075	0.030	5882215
Dibenzo(a,c) anthracene + Picene	ug	ND	ND	ND	0.15	0.030	5882215
Dibenzo(a,c)anthracene	ug	ND	ND	ND	0.15	0.030	5882215
Dibenzo(a,e)pyrene	ug	ND	ND	ND	0.30	0.060	5882215
Fluoranthene	ug	0.120	0.120	0.090	0.075	0.030	5882215
Fluorene	ug	0.210	0.240	0.180	0.075	0.030	5882215
Indeno(1,2,3-cd)pyrene	ug	ND	ND	ND	0.075	0.030	5882215
Naphthalene	ug	5.13	4.29	4.32	0.11	0.031	5882215
Perylene	ug	ND	ND	ND	0.15	0.030	5882215
Phenanthrene	ug	0.420	0.480	0.360	0.075	0.030	5882215
Picene	ug	ND	ND	ND	0.15	0.030	5882215
Pyrene	ug	ND	0.090	ND	0.075	0.030	5882215
Tetralin	ug	0.48	0.48	0.51	0.15	0.030	5882215

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

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Maxxam Job #: B8X0068
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RWDI Air Inc
Site Location: ST. MARYS

SEMI-VOLATILE ORGANICS BY GC-MS (PUF AND FILTER)

Maxxam ID		INA809	INA810	INA811			
Sampling Date		2018/12/06	2018/12/06	2018/12/06			
COC Number		na	na	na			
	UNITS	**OPG-DEC06 PUF (2 SAMPLES)**	**COVE-DEC06 PUF (2 SAMPLES)**	**BEACH-DEC06 PUF (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
Surrogate Recovery (%)							
D10-2-Methylnaphthalene	%	80	62	74			5882215
D10-Fluoranthene	%	94	78	88			5882215
D10-Fluorene (FS)	%	80	64	74			5882215
D10-Phenanthrene	%	84	70	78			5882215
D12-Benzo(a)anthracene	%	106	84	98			5882215
D12-Benzo(a)pyrene	%	100	82	92			5882215
D12-Benzo(b)fluoranthene	%	114	90	106			5882215
D12-Benzo(ghi)perylene	%	112	90	106			5882215
D12-Benzo(k)fluoranthene	%	126	102	118			5882215
D12-Chrysene	%	106	84	98			5882215
D12-Indeno(1,2,3-cd)pyrene	%	116	92	108			5882215
D12-Perylene	%	102	86	96			5882215
D14-Dibenzo(a,h)anthracene	%	110	88	104			5882215
D14-Terphenyl (FS)	%	84	72	78			5882215
D8-Acenaphthylene	%	80	64	74			5882215
D8-Naphthalene	%	78	62	74			5882215

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8X0068
Report Date: 2019/01/03

RWDI Air Inc
Site Location: ST. MARYS

SEMI-VOLATILE ORGANICS BY GC-MS (PUF AND FILTER)

Maxxam ID		INA812	INA813	INA814			
Sampling Date		2018/12/07	2018/12/07	2018/12/07			
COC Number		na	na	na			
	UNITS	**OPG-DEC07 PUF (2 SAMPLES)**	**COVE-DEC07 PUF (2 SAMPLES)**	**BEACH-DEC07 PUF (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
1-Methylnaphthalene	ug	0.84	0.75	0.66	0.15	0.030	5882215
1-Methylphenanthrene	ug	ND	ND	ND	0.15	0.030	5882215
2-Chloronaphthalene	ug	ND	ND	ND	0.15	0.030	5882215
2-Methylanthracene	ug	ND	ND	ND	0.15	0.030	5882215
2-Methylnaphthalene	ug	1.35	1.14	0.96	0.15	0.030	5882215
3-Methylcholanthrene	ug	ND	ND	ND	3.0	0.60	5882215
7,12-Dimethylbenzo(a)anthracene	ug	ND	ND	ND	0.60	N/A	5882215
9,10-Dimethylanthracene	ug	ND	ND	ND	0.60	0.12	5882215
Acenaphthene	ug	0.090	0.120	0.090	0.075	0.030	5882215
Acenaphthylene	ug	0.090	ND	ND	0.075	0.030	5882215
Anthracene	ug	ND	ND	ND	0.075	0.030	5882215
Benzo(a)anthracene	ug	ND	ND	ND	0.075	0.030	5882215
Benzo(a)fluorene	ug	ND	ND	ND	0.15	0.030	5882215
Benzo(b)fluoranthene	ug	ND	ND	ND	0.075	0.030	5882215
Benzo(b)fluorene	ug	ND	ND	ND	0.15	0.030	5882215
Benzo(e)pyrene	ug	ND	ND	ND	0.15	0.030	5882215
Benzo(g,h,i)perylene	ug	ND	ND	ND	0.075	0.030	5882215
Benzo(k)fluoranthene	ug	ND	ND	ND	0.075	0.030	5882215
Chrysene	ug	ND	ND	ND	0.075	0.030	5882215
Coronene	ug	ND	ND	ND	0.15	0.030	5882215
Dibenz(a,h)anthracene	ug	ND	ND	ND	0.075	0.030	5882215
Dibenzo(a,c) anthracene + Picene	ug	ND	ND	ND	0.15	0.030	5882215
Dibenzo(a,c)anthracene	ug	ND	ND	ND	0.15	0.030	5882215
Dibenzo(a,e)pyrene	ug	ND	ND	ND	0.30	0.060	5882215
Fluoranthene	ug	0.180	0.180	0.120	0.075	0.030	5882215
Fluorene	ug	0.180	0.270	0.150	0.075	0.030	5882215
Indeno(1,2,3-cd)pyrene	ug	ND	ND	ND	0.075	0.030	5882215
Naphthalene	ug	5.01	4.62	3.87	0.11	0.031	5882215
Perylene	ug	ND	ND	ND	0.15	0.030	5882215
Phenanthrene	ug	0.510	0.660	0.360	0.075	0.030	5882215
Picene	ug	ND	ND	ND	0.15	0.030	5882215
Pyrene	ug	0.150	0.180	0.090	0.075	0.030	5882215
Tetralin	ug	0.33	0.33	0.33	0.15	0.030	5882215

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

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SEMI-VOLATILE ORGANICS BY GC-MS (PUF AND FILTER)

Maxxam ID		INA812	INA813	INA814			
Sampling Date		2018/12/07	2018/12/07	2018/12/07			
COC Number		na	na	na			
	UNITS	**OPG-DEC07 PUF (2 SAMPLES)**	**COVE-DEC07 PUF (2 SAMPLES)**	**BEACH-DEC07 PUF (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
Surrogate Recovery (%)							
D10-2-Methylnaphthalene	%	74	82	66			5882215
D10-Fluoranthene	%	94	104	78			5882215
D10-Fluorene (FS)	%	76	84	66			5882215
D10-Phenanthrene	%	82	90	70			5882215
D12-Benzo(a)anthracene	%	98	112	86			5882215
D12-Benzo(a)pyrene	%	88	106	76			5882215
D12-Benzo(b)fluoranthene	%	106	120	94			5882215
D12-Benzo(ghi)perylene	%	106	118	92			5882215
D12-Benzo(k)fluoranthene	%	116	132	102			5882215
D12-Chrysene	%	98	110	88			5882215
D12-Indeno(1,2,3-cd)pyrene	%	106	122	94			5882215
D12-Perylene	%	96	108	86			5882215
D14-Dibenzo(a,h)anthracene	%	104	114	90			5882215
D14-Terphenyl (FS)	%	86	94	72			5882215
D8-Acenaphthylene	%	72	84	64			5882215
D8-Naphthalene	%	74	84	68			5882215

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Report Date: 2019/01/03

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SEMI-VOLATILE ORGANICS BY GC-MS (PUF AND FILTER)

Maxxam ID		INA815	INA816	INA817			
Sampling Date		2018/12/08	2018/12/08	2018/12/08			
COC Number		na	na	na			
	UNITS	**OPG-DEC08 PUF (2 SAMPLES)**	**COVE-DEC08 PUF (2 SAMPLES)**	**BEACH-DEC08 PUF (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
1-Methylnaphthalene	ug	0.99	1.14	1.08	0.15	0.030	5882215
1-Methylphenanthrene	ug	ND	0.15	ND	0.15	0.030	5882215
2-Chloronaphthalene	ug	ND	ND	ND	0.15	0.030	5882215
2-Methylanthracene	ug	ND	ND	ND	0.15	0.030	5882215
2-Methylnaphthalene	ug	1.68	1.83	1.71	0.15	0.030	5882215
3-Methylcholanthrene	ug	ND	ND	ND	3.0	0.60	5882215
7,12-Dimethylbenzo(a)anthracene	ug	ND	ND	ND	0.60	N/A	5882215
9,10-Dimethylanthracene	ug	ND	ND	ND	0.60	0.12	5882215
Acenaphthene	ug	0.120	0.150	0.120	0.075	0.030	5882215
Acenaphthylene	ug	ND	ND	ND	0.075	0.030	5882215
Anthracene	ug	ND	ND	ND	0.075	0.030	5882215
Benzo(a)anthracene	ug	ND	ND	ND	0.075	0.030	5882215
Benzo(a)fluorene	ug	ND	ND	ND	0.15	0.030	5882215
Benzo(b)fluoranthene	ug	ND	ND	ND	0.075	0.030	5882215
Benzo(b)fluorene	ug	ND	ND	ND	0.15	0.030	5882215
Benzo(e)pyrene	ug	ND	ND	ND	0.15	0.030	5882215
Benzo(g,h,i)perylene	ug	ND	ND	ND	0.075	0.030	5882215
Benzo(k)fluoranthene	ug	ND	ND	ND	0.075	0.030	5882215
Chrysene	ug	ND	ND	ND	0.075	0.030	5882215
Coronene	ug	ND	ND	ND	0.15	0.030	5882215
Dibenz(a,h)anthracene	ug	ND	ND	ND	0.075	0.030	5882215
Dibenzo(a,c) anthracene + Picene	ug	ND	ND	ND	0.15	0.030	5882215
Dibenzo(a,c)anthracene	ug	ND	ND	ND	0.15	0.030	5882215
Dibenzo(a,e)pyrene	ug	ND	ND	ND	0.30	0.060	5882215
Fluoranthene	ug	0.120	0.180	0.120	0.075	0.030	5882215
Fluorene	ug	0.210	0.330	0.210	0.075	0.030	5882215
Indeno(1,2,3-cd)pyrene	ug	ND	ND	ND	0.075	0.030	5882215
Naphthalene	ug	5.61	4.95	5.07	0.11	0.031	5882215
Perylene	ug	ND	ND	ND	0.15	0.030	5882215
Phenanthrene	ug	0.450	0.840	0.510	0.075	0.030	5882215
Picene	ug	ND	ND	ND	0.15	0.030	5882215
Pyrene	ug	0.090	0.210	ND	0.075	0.030	5882215
Tetralin	ug	0.42	0.60	0.57	0.15	0.030	5882215

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

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RWDI Air Inc
Site Location: ST. MARYS

SEMI-VOLATILE ORGANICS BY GC-MS (PUF AND FILTER)

Maxxam ID		INA815	INA816	INA817			
Sampling Date		2018/12/08	2018/12/08	2018/12/08			
COC Number		na	na	na			
	UNITS	**OPG-DEC08 PUF (2 SAMPLES)**	**COVE-DEC08 PUF (2 SAMPLES)**	**BEACH-DEC08 PUF (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
Surrogate Recovery (%)							
D10-2-Methylnaphthalene	%	70	66	74			5882215
D10-Fluoranthene	%	90	82	90			5882215
D10-Fluorene (FS)	%	72	66	74			5882215
D10-Phenanthrene	%	78	72	80			5882215
D12-Benzo(a)anthracene	%	94	90	100			5882215
D12-Benzo(a)pyrene	%	84	88	94			5882215
D12-Benzo(b)fluoranthene	%	102	98	110			5882215
D12-Benzo(ghi)perylene	%	100	94	104			5882215
D12-Benzo(k)fluoranthene	%	112	104	114			5882215
D12-Chrysene	%	92	88	96			5882215
D12-Indeno(1,2,3-cd)pyrene	%	100	96	108			5882215
D12-Perylene	%	92	90	96			5882215
D14-Dibenzo(a,h)anthracene	%	98	92	102			5882215
D14-Terphenyl (FS)	%	82	74	82			5882215
D8-Acenaphthylene	%	70	68	74			5882215
D8-Naphthalene	%	70	66	74			5882215

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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SEMI-VOLATILE ORGANICS BY GC-MS (PUF AND FILTER)

Maxxam ID		INA818			
Sampling Date					
COC Number		na			
	UNITS	BLANK PUF (2 SAMPLES)	RDL	MDL	QC Batch
1-Methylnaphthalene	ug	ND	0.15	0.030	5882215
1-Methylphenanthrene	ug	ND	0.15	0.030	5882215
2-Chloronaphthalene	ug	ND	0.15	0.030	5882215
2-Methylanthracene	ug	ND	0.15	0.030	5882215
2-Methylnaphthalene	ug	ND	0.15	0.030	5882215
3-Methylcholanthrene	ug	ND	3.0	0.60	5882215
7,12-Dimethylbenzo(a)anthracene	ug	ND	0.60	N/A	5882215
9,10-Dimethylanthracene	ug	ND	0.60	0.12	5882215
Acenaphthene	ug	ND	0.075	0.030	5882215
Acenaphthylene	ug	ND	0.075	0.030	5882215
Anthracene	ug	ND	0.075	0.030	5882215
Benzo(a)anthracene	ug	ND	0.075	0.030	5882215
Benzo(a)fluorene	ug	ND	0.15	0.030	5882215
Benzo(b)fluoranthene	ug	ND	0.075	0.030	5882215
Benzo(b)fluorene	ug	ND	0.15	0.030	5882215
Benzo(e)pyrene	ug	ND	0.15	0.030	5882215
Benzo(g,h,i)perylene	ug	ND	0.075	0.030	5882215
Benzo(k)fluoranthene	ug	ND	0.075	0.030	5882215
Chrysene	ug	ND	0.075	0.030	5882215
Coronene	ug	ND	0.15	0.030	5882215
Dibenz(a,h)anthracene	ug	ND	0.075	0.030	5882215
Dibenzo(a,c) anthracene + Picene	ug	ND	0.15	0.030	5882215
Dibenzo(a,c)anthracene	ug	ND	0.15	0.030	5882215
Dibenzo(a,e)pyrene	ug	ND	0.30	0.060	5882215
Fluoranthene	ug	ND	0.075	0.030	5882215
Fluorene	ug	ND	0.075	0.030	5882215
Indeno(1,2,3-cd)pyrene	ug	ND	0.075	0.030	5882215
Naphthalene	ug	ND	0.11	0.031	5882215
Perylene	ug	ND	0.15	0.030	5882215
Phenanthrene	ug	ND	0.075	0.030	5882215
Picene	ug	ND	0.15	0.030	5882215
Pyrene	ug	ND	0.075	0.030	5882215
Tetralin	ug	ND	0.15	0.030	5882215

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

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SEMI-VOLATILE ORGANICS BY GC-MS (PUF AND FILTER)

Maxxam ID		INA818			
Sampling Date					
COC Number		na			
	UNITS	**BLANK PUF (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
Surrogate Recovery (%)					
D10-2-Methylnaphthalene	%	72			5882215
D10-Fluoranthene	%	86			5882215
D10-Fluorene (FS)	%	72			5882215
D10-Phenanthrene	%	76			5882215
D12-Benzo(a)anthracene	%	94			5882215
D12-Benzo(a)pyrene	%	98			5882215
D12-Benzo(b)fluoranthene	%	102			5882215
D12-Benzo(ghi)perylene	%	102			5882215
D12-Benzo(k)fluoranthene	%	116			5882215
D12-Chrysene	%	94			5882215
D12-Indeno(1,2,3-cd)pyrene	%	106			5882215
D12-Perylene	%	100			5882215
D14-Dibenzo(a,h)anthracene	%	100			5882215
D14-Terphenyl (FS)	%	78			5882215
D8-Acenaphthylene	%	72			5882215
D8-Naphthalene	%	74			5882215

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8X0068
Report Date: 2019/01/03

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA803							
Sampling Date		2018/12/04							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	OPG-DEC04 PUF (2 SAMPLES)	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	ND	3.3	30	6.0	1.00	3.30		5901999
1,2,3,7,8-Penta CDD *	pg	ND	3.2	30	6.0	1.00	3.20		5901999
1,2,3,4,7,8-Hexa CDD *	pg	ND	3.9	30	6.0	0.100	0.390		5901999
1,2,3,6,7,8-Hexa CDD *	pg	7.0	3.4	30	6.0	0.100	0.700		5901999
1,2,3,7,8,9-Hexa CDD *	pg	ND (1)	7.5	30	6.0	0.100	0.750		5901999
1,2,3,4,6,7,8-Hepta CDD *	pg	81.3	3.1	30	9.0	0.0100	0.813		5901999
Octa CDD *	pg	157	3.4	300	9.0	0.000300	0.0471		5901999
Total Tetra CDD *	pg	ND	3.3	30	N/A			0	5901999
Total Penta CDD *	pg	ND	3.2	30	N/A			0	5901999
Total Hexa CDD *	pg	46.7	3.5	30	N/A			3	5901999
Total Hepta CDD *	pg	155	3.1	30	N/A			2	5901999
2,3,7,8-Tetra CDF **	pg	5.5	3.1	30	6.0	0.100	0.550		5901999
1,2,3,7,8-Penta CDF **	pg	ND	3.0	30	6.0	0.0300	0.0900		5901999
2,3,4,7,8-Penta CDF **	pg	ND	3.0	30	6.0	0.300	0.900		5901999
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.0	30	6.0	0.100	0.300		5901999
1,2,3,6,7,8-Hexa CDF **	pg	ND	2.7	30	6.0	0.100	0.270		5901999
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.2	30	6.0	0.100	0.320		5901999
1,2,3,7,8,9-Hexa CDF **	pg	ND	3.6	30	6.0	0.100	0.360		5901999
1,2,3,4,6,7,8-Hepta CDF **	pg	ND (1)	2.8	30	9.0	0.0100	0.0280		5901999
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	3.7	30	6.0	0.0100	0.0370		5901999
Octa CDF **	pg	ND (1)	4.6	300	15	0.000300	0.00138		5901999
Total Tetra CDF **	pg	5.5	3.1	30	N/A			1	5901999
Total Penta CDF **	pg	ND (2)	3.5	30	N/A			0	5901999
Total Hexa CDF **	pg	4.5	3.1	30	N/A			1	5901999

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

ND = Not detected

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

RT>2 seconds - PCDD/DF analysis-Peak maxima of monitored ions exceeds 2 seconds

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RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA803							
Sampling Date		2018/12/04							
COC Number		na				**TOXIC EQUIVALENCY**		# of	
	UNITS	**OPG-DEC04 PUF (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Total Hepta CDF **	pg	ND (1)	3.5	30	N/A			0	5901999
Toxic Equivalency	pg	ND	3.1	N/A	N/A				5901999
TOTAL TOXIC EQUIVALENCY	pg						12.1		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	96							5901999
C13-1234678 HeptaCDF **	%	79							5901999
C13-123478 HexaCDD *	%	125							5901999
C13-123478 HexaCDF **	%	111							5901999
C13-1234789 HeptaCDF **	%	111							5901999
C13-123678 HexaCDD *	%	84							5901999
C13-123678 HexaCDF **	%	77							5901999
C13-12378 PentaCDD *	%	109							5901999
C13-12378 PentaCDF **	%	90							5901999
C13-123789 HexaCDF **	%	74							5901999
C13-23478 PentaCDF **	%	115							5901999
C13-2378 TetraCDD *	%	110							5901999
C13-2378 TetraCDF **	%	83							5901999
C13-OCDD *	%	132 (2)							5901999
Cl37-2378 TetraCDD *	%	84							5901999

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
** CDF = Chloro Dibenzo-p-Furan
N/A = Not Applicable
ND = Not detected
* CDD = Chloro Dibenzo-p-Dioxin
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.
(2) Recovery exceeds method criteria.
Minimal impact on data

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Report Date: 2019/01/03

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DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA804							
Sampling Date		2018/12/04							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	COVE-DEC04 PUF (2 SAMPLES)	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	ND	3.4	30	6.0	1.00	3.40		5901999
1,2,3,7,8-Penta CDD *	pg	ND	3.5	30	6.0	1.00	3.50		5901999
1,2,3,4,7,8-Hexa CDD *	pg	4.5	3.4	30	6.0	0.100	0.450		5901999
1,2,3,6,7,8-Hexa CDD *	pg	11.2	3.0	30	6.0	0.100	1.12		5901999
1,2,3,7,8,9-Hexa CDD *	pg	16.9	3.0	30	6.0	0.100	1.69		5901999
1,2,3,4,6,7,8-Hepta CDD *	pg	126	3.3	30	9.0	0.0100	1.26		5901999
Octa CDD *	pg	215	3.1	300	9.0	0.000300	0.0645		5901999
Total Tetra CDD *	pg	ND	3.4	30	N/A			0	5901999
Total Penta CDD *	pg	ND (1)	5.0	30	N/A			0	5901999
Total Hexa CDD *	pg	113	3.1	30	N/A			6	5901999
Total Hepta CDD *	pg	241	3.3	30	N/A			2	5901999
2,3,7,8-Tetra CDF **	pg	4.8	3.1	30	6.0	0.100	0.480		5901999
1,2,3,7,8-Penta CDF **	pg	ND	3.1	30	6.0	0.0300	0.0930		5901999
2,3,4,7,8-Penta CDF **	pg	ND	3.1	30	6.0	0.300	0.930		5901999
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.0	30	6.0	0.100	0.300		5901999
1,2,3,6,7,8-Hexa CDF **	pg	ND	2.7	30	6.0	0.100	0.270		5901999
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.2	30	6.0	0.100	0.320		5901999
1,2,3,7,8,9-Hexa CDF **	pg	ND	3.7	30	6.0	0.100	0.370		5901999
1,2,3,4,6,7,8-Hepta CDF **	pg	ND (1)	5.4	30	9.0	0.0100	0.0540		5901999
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	3.7	30	6.0	0.0100	0.0370		5901999
Octa CDF **	pg	5.5	3.4	300	15	0.000300	0.00165		5901999
Total Tetra CDF **	pg	4.8	3.1	30	N/A			1	5901999
Total Penta CDF **	pg	ND	3.1	30	N/A			0	5901999
Total Hexa CDF **	pg	4.5	3.1	30	N/A			1	5901999
Total Hepta CDF **	pg	ND (1)	6.3	30	N/A			0	5901999
Toxic Equivalency	pg	5.2	3.1	N/A	N/A				5901999

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA804							
Sampling Date		2018/12/04							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	COVE-DEC04 PUF (2 SAMPLES)	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
TOTAL TOXIC EQUIVALENCY	pg						14.3		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	91							5901999
C13-1234678 HeptaCDF **	%	75							5901999
C13-123478 HexaCDD *	%	128							5901999
C13-123478 HexaCDF **	%	119							5901999
C13-1234789 HeptaCDF **	%	116							5901999
C13-123678 HexaCDD *	%	78							5901999
C13-123678 HexaCDF **	%	74							5901999
C13-12378 PentaCDD *	%	103							5901999
C13-12378 PentaCDF **	%	85							5901999
C13-123789 HexaCDF **	%	71							5901999
C13-23478 PentaCDF **	%	113							5901999
C13-2378 TetraCDD *	%	106							5901999
C13-2378 TetraCDF **	%	79							5901999
C13-OCDD *	%	124							5901999
Cl37-2378 TetraCDD *	%	90							5901999

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

** CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B8X0068
Report Date: 2019/01/03

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA805							
Sampling Date		2018/12/04							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	**BEACH-DEC04 PUF (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	ND	3.2	30	6.0	1.00	3.20		5901999
1,2,3,7,8-Penta CDD *	pg	ND	3.2	30	6.0	1.00	3.20		5901999
1,2,3,4,7,8-Hexa CDD *	pg	3.8	3.4	30	6.0	0.100	0.380		5901999
1,2,3,6,7,8-Hexa CDD *	pg	7.3	3.0	30	6.0	0.100	0.730		5901999
1,2,3,7,8,9-Hexa CDD *	pg	8.2	3.0	30	6.0	0.100	0.820		5901999
1,2,3,4,6,7,8-Hepta CDD *	pg	90.1	3.1	30	9.0	0.0100	0.901		5901999
Octa CDD *	pg	165	3.3	300	9.0	0.000300	0.0495		5901999
Total Tetra CDD *	pg	ND	3.2	30	N/A			0	5901999
Total Penta CDD *	pg	4.9	3.2	30	N/A			1	5901999
Total Hexa CDD *	pg	77.1	3.1	30	N/A			6	5901999
Total Hepta CDD *	pg	172	3.1	30	N/A			2	5901999
2,3,7,8-Tetra CDF **	pg	3.9	3.2	30	6.0	0.100	0.390		5901999
1,2,3,7,8-Penta CDF **	pg	ND	3.2	30	6.0	0.0300	0.0960		5901999
2,3,4,7,8-Penta CDF **	pg	ND	3.2	30	6.0	0.300	0.960		5901999
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.0	30	6.0	0.100	0.300		5901999
1,2,3,6,7,8-Hexa CDF **	pg	ND	2.7	30	6.0	0.100	0.270		5901999
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.2	30	6.0	0.100	0.320		5901999
1,2,3,7,8,9-Hexa CDF **	pg	ND	3.6	30	6.0	0.100	0.360		5901999
1,2,3,4,6,7,8-Hepta CDF **	pg	ND (1)	4.9	30	9.0	0.0100	0.0490		5901999
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	3.6	30	6.0	0.0100	0.0360		5901999
Octa CDF **	pg	5.7	3.3	300	15	0.000300	0.00171		5901999
Total Tetra CDF **	pg	3.9	3.2	30	N/A			1	5901999
Total Penta CDF **	pg	ND	3.2	30	N/A			0	5901999
Total Hexa CDF **	pg	3.4	3.1	30	N/A			1	5901999
Total Hepta CDF **	pg	ND (1)	5.8	30	N/A			0	5901999
Toxic Equivalency	pg	3.4	3.2	N/A	N/A				5901999

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

ND = Not detected

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA805							
Sampling Date		2018/12/04							
COC Number		na				**TOXIC EQUIVALENCY**		# of	
	UNITS	**BEACH-DEC04 PUF (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
TOTAL TOXIC EQUIVALENCY	pg						12.1		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	98							5901999
C13-1234678 HeptaCDF **	%	77							5901999
C13-123478 HexaCDD *	%	122							5901999
C13-123478 HexaCDF **	%	116							5901999
C13-1234789 HeptaCDF **	%	115							5901999
C13-123678 HexaCDD *	%	83							5901999
C13-123678 HexaCDF **	%	77							5901999
C13-12378 PentaCDD *	%	109							5901999
C13-12378 PentaCDF **	%	89							5901999
C13-123789 HexaCDF **	%	76							5901999
C13-23478 PentaCDF **	%	120							5901999
C13-2378 TetraCDD *	%	109							5901999
C13-2378 TetraCDF **	%	83							5901999
C13-OCDD *	%	125							5901999
Cl37-2378 TetraCDD *	%	86							5901999

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

** CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B8X0068
Report Date: 2019/01/03

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA806							
Sampling Date		2018/12/05							
COC Number		na				**TOXIC EQUIVALENCY**		# of	
	UNITS	**OPG-DEC05 PUF (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	ND	3.0	30	6.0	1.00	3.00		5901999
1,2,3,7,8-Penta CDD *	pg	ND	3.4	30	6.0	1.00	3.40		5901999
1,2,3,4,7,8-Hexa CDD *	pg	ND	3.5	30	6.0	0.100	0.350		5901999
1,2,3,6,7,8-Hexa CDD *	pg	ND	3.1	30	6.0	0.100	0.310		5901999
1,2,3,7,8,9-Hexa CDD *	pg	ND	3.1	30	6.0	0.100	0.310		5901999
1,2,3,4,6,7,8-Hepta CDD *	pg	20.5	3.1	30	9.0	0.0100	0.205		5901999
Octa CDD *	pg	51.3	3.1	300	9.0	0.000300	0.0154		5901999
Total Tetra CDD *	pg	ND	3.0	30	N/A			0	5901999
Total Penta CDD *	pg	ND	3.4	30	N/A			0	5901999
Total Hexa CDD *	pg	11.8	3.2	30	N/A			2	5901999
Total Hepta CDD *	pg	43.4	3.1	30	N/A			2	5901999
2,3,7,8-Tetra CDF **	pg	ND (1)	3.6	30	6.0	0.100	0.360		5901999
1,2,3,7,8-Penta CDF **	pg	ND	3.0	30	6.0	0.0300	0.0900		5901999
2,3,4,7,8-Penta CDF **	pg	ND	3.1	30	6.0	0.300	0.930		5901999
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.0	30	6.0	0.100	0.300		5901999
1,2,3,6,7,8-Hexa CDF **	pg	ND	2.7	30	6.0	0.100	0.270		5901999
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.2	30	6.0	0.100	0.320		5901999
1,2,3,7,8,9-Hexa CDF **	pg	ND	3.7	30	6.0	0.100	0.370		5901999
1,2,3,4,6,7,8-Hepta CDF **	pg	3.8	2.7	30	9.0	0.0100	0.0380		5901999
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	3.8	30	6.0	0.0100	0.0380		5901999
Octa CDF **	pg	ND	3.5	300	15	0.000300	0.00105		5901999
Total Tetra CDF **	pg	3.6	3.2	30	N/A			1	5901999
Total Penta CDF **	pg	ND	3.1	30	N/A			0	5901999
Total Hexa CDF **	pg	ND	3.1	30	N/A			0	5901999
Total Hepta CDF **	pg	3.8	3.1	30	N/A			1	5901999
Toxic Equivalency	pg	ND	3.6	N/A	N/A				5901999

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan
(1) RT > 3 seconds - PCDD/DF analysis - Peak detected exceeds expected retention time (from internal standard) by greater than 3 seconds.

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA806							
Sampling Date		2018/12/05							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	**OPG-DEC05 PUF (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
TOTAL TOXIC EQUIVALENCY	pg						10.3		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	100							5901999
C13-1234678 HeptaCDF **	%	81							5901999
C13-123478 HexaCDD *	%	124							5901999
C13-123478 HexaCDF **	%	117							5901999
C13-1234789 HeptaCDF **	%	109							5901999
C13-123678 HexaCDD *	%	90							5901999
C13-123678 HexaCDF **	%	80							5901999
C13-12378 PentaCDD *	%	106							5901999
C13-12378 PentaCDF **	%	84							5901999
C13-123789 HexaCDF **	%	77							5901999
C13-23478 PentaCDF **	%	114							5901999
C13-2378 TetraCDD *	%	104							5901999
C13-2378 TetraCDF **	%	78							5901999
C13-OCDD *	%	130							5901999
Cl37-2378 TetraCDD *	%	88							5901999

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8X0068
Report Date: 2019/01/03

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA807							
Sampling Date		2018/12/05							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	**COVE-DEC05 PUF (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	ND	3.0	30	6.0	1.00	3.00		5901999
1,2,3,7,8-Penta CDD *	pg	ND	3.1	30	6.0	1.00	3.10		5901999
1,2,3,4,7,8-Hexa CDD *	pg	ND	3.9	30	6.0	0.100	0.390		5901999
1,2,3,6,7,8-Hexa CDD *	pg	ND	3.4	30	6.0	0.100	0.340		5901999
1,2,3,7,8,9-Hexa CDD *	pg	ND	3.4	30	6.0	0.100	0.340		5901999
1,2,3,4,6,7,8-Hepta CDD *	pg	20.5	3.2	30	9.0	0.0100	0.205		5901999
Octa CDD *	pg	49.0	3.2	300	9.0	0.000300	0.0147		5901999
Total Tetra CDD *	pg	ND	3.0	30	N/A			0	5901999
Total Penta CDD *	pg	ND	3.1	30	N/A			0	5901999
Total Hexa CDD *	pg	4.5	3.5	30	N/A			1	5901999
Total Hepta CDD *	pg	43.2	3.2	30	N/A			2	5901999
2,3,7,8-Tetra CDF **	pg	4.1	3.3	30	6.0	0.100	0.410		5901999
1,2,3,7,8-Penta CDF **	pg	ND	3.1	30	6.0	0.0300	0.0930		5901999
2,3,4,7,8-Penta CDF **	pg	ND	3.1	30	6.0	0.300	0.930		5901999
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.3	30	6.0	0.100	0.330		5901999
1,2,3,6,7,8-Hexa CDF **	pg	ND	3.0	30	6.0	0.100	0.300		5901999
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.6	30	6.0	0.100	0.360		5901999
1,2,3,7,8,9-Hexa CDF **	pg	ND	4.0	30	6.0	0.100	0.400		5901999
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	2.7	30	9.0	0.0100	0.0270		5901999
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	3.8	30	6.0	0.0100	0.0380		5901999
Octa CDF **	pg	ND (1)	3.5	300	15	0.000300	0.00105		5901999
Total Tetra CDF **	pg	4.1	3.3	30	N/A			1	5901999
Total Penta CDF **	pg	ND	3.1	30	N/A			0	5901999
Total Hexa CDF **	pg	ND	3.4	30	N/A			0	5901999
Total Hepta CDF **	pg	ND	3.1	30	N/A			0	5901999
Toxic Equivalency	pg	ND	3.3	N/A	N/A				5901999

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

ND = Not detected

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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Maxxam Job #: B8X0068
Report Date: 2019/01/03

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA807							
Sampling Date		2018/12/05							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	COVE-DEC05 PUF (2 SAMPLES)	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
TOTAL TOXIC EQUIVALENCY	pg						10.3		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	102							5901999
C13-1234678 HeptaCDF **	%	81							5901999
C13-123478 HexaCDD *	%	124							5901999
C13-123478 HexaCDF **	%	117							5901999
C13-1234789 HeptaCDF **	%	112							5901999
C13-123678 HexaCDD *	%	88							5901999
C13-123678 HexaCDF **	%	80							5901999
C13-12378 PentaCDD *	%	108							5901999
C13-12378 PentaCDF **	%	87							5901999
C13-123789 HexaCDF **	%	73							5901999
C13-23478 PentaCDF **	%	121							5901999
C13-2378 TetraCDD *	%	113							5901999
C13-2378 TetraCDF **	%	85							5901999
C13-OCDD *	%	135 (1)							5901999
Cl37-2378 TetraCDD *	%	84							5901999

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan
(1) Recovery exceeds method criteria.
Minimal impact on data

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B8X0068
Report Date: 2019/01/03

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA808							
Sampling Date		2018/12/05							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	**BEACH-DEC05 PUF (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	ND	3.3	30	6.0	1.00	3.30		5901999
1,2,3,7,8-Penta CDD *	pg	ND	3.2	30	6.0	1.00	3.20		5901999
1,2,3,4,7,8-Hexa CDD *	pg	ND	3.6	30	6.0	0.100	0.360		5901999
1,2,3,6,7,8-Hexa CDD *	pg	ND	3.2	30	6.0	0.100	0.320		5901999
1,2,3,7,8,9-Hexa CDD *	pg	3.7	3.2	30	6.0	0.100	0.370		5901999
1,2,3,4,6,7,8-Hepta CDD *	pg	20.2	3.1	30	9.0	0.0100	0.202		5901999
Octa CDD *	pg	50.0	3.3	300	9.0	0.000300	0.0150		5901999
Total Tetra CDD *	pg	ND	3.3	30	N/A			0	5901999
Total Penta CDD *	pg	ND	3.2	30	N/A			0	5901999
Total Hexa CDD *	pg	15.0	3.3	30	N/A			3	5901999
Total Hepta CDD *	pg	42.4	3.1	30	N/A			2	5901999
2,3,7,8-Tetra CDF **	pg	8.7	3.1	30	6.0	0.100	0.870		5901999
1,2,3,7,8-Penta CDF **	pg	ND	3.1	30	6.0	0.0300	0.0930		5901999
2,3,4,7,8-Penta CDF **	pg	ND	3.2	30	6.0	0.300	0.960		5901999
1,2,3,4,7,8-Hexa CDF **	pg	ND	2.9	30	6.0	0.100	0.290		5901999
1,2,3,6,7,8-Hexa CDF **	pg	ND	2.6	30	6.0	0.100	0.260		5901999
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.1	30	6.0	0.100	0.310		5901999
1,2,3,7,8,9-Hexa CDF **	pg	ND	3.5	30	6.0	0.100	0.350		5901999
1,2,3,4,6,7,8-Hepta CDF **	pg	4.2	2.8	30	9.0	0.0100	0.0420		5901999
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	4.0	30	6.0	0.0100	0.0400		5901999
Octa CDF **	pg	ND	3.2	300	15	0.000300	0.000960		5901999
Total Tetra CDF **	pg	17.3	3.1	30	N/A			3	5901999
Total Penta CDF **	pg	ND (1)	7.0	30	N/A			0	5901999
Total Hexa CDF **	pg	3.2	3.0	30	N/A			1	5901999
Total Hepta CDF **	pg	4.2	3.3	30	N/A			1	5901999
Toxic Equivalency	pg	ND	3.1	N/A	N/A				5901999

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B8X0068
Report Date: 2019/01/03

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA808							
Sampling Date		2018/12/05							
COC Number		na				**TOXIC EQUIVALENCY**		# of	
	UNITS	**BEACH-DEC05 PUF (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
TOTAL TOXIC EQUIVALENCY	pg						11.0		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	94							5901999
C13-1234678 HeptaCDF **	%	75							5901999
C13-123478 HexaCDD *	%	119							5901999
C13-123478 HexaCDF **	%	114							5901999
C13-1234789 HeptaCDF **	%	110							5901999
C13-123678 HexaCDD *	%	85							5901999
C13-123678 HexaCDF **	%	73							5901999
C13-12378 PentaCDD *	%	110							5901999
C13-12378 PentaCDF **	%	84							5901999
C13-123789 HexaCDF **	%	74							5901999
C13-23478 PentaCDF **	%	121							5901999
C13-2378 TetraCDD *	%	103							5901999
C13-2378 TetraCDF **	%	79							5901999
C13-OCDD *	%	122							5901999
Cl37-2378 TetraCDD *	%	84							5901999

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8X0068
Report Date: 2019/01/03

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA809							
Sampling Date		2018/12/06							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	**OPG-DEC06 PUF (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	6.3	3.3	30	6.0	1.00	6.30		5901999
1,2,3,7,8-Penta CDD *	pg	ND	3.5	30	6.0	1.00	3.50		5901999
1,2,3,4,7,8-Hexa CDD *	pg	ND	3.4	30	6.0	0.100	0.340		5901999
1,2,3,6,7,8-Hexa CDD *	pg	3.9	3.0	30	6.0	0.100	0.390		5901999
1,2,3,7,8,9-Hexa CDD *	pg	ND	3.0	30	6.0	0.100	0.300		5901999
1,2,3,4,6,7,8-Hepta CDD *	pg	45.6	3.5	30	9.0	0.0100	0.456		5901999
Octa CDD *	pg	108	3.4	300	9.0	0.000300	0.0324		5901999
Total Tetra CDD *	pg	ND	3.3	30	N/A			0	5901999
Total Penta CDD *	pg	ND	3.5	30	N/A			0	5901999
Total Hexa CDD *	pg	26.4	3.1	30	N/A			3	5901999
Total Hepta CDD *	pg	92.7	3.5	30	N/A			2	5901999
2,3,7,8-Tetra CDF **	pg	ND	3.5	30	6.0	0.100	0.350		5901999
1,2,3,7,8-Penta CDF **	pg	ND	3.4	30	6.0	0.0300	0.102		5901999
2,3,4,7,8-Penta CDF **	pg	ND	3.5	30	6.0	0.300	1.05		5901999
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.1	30	6.0	0.100	0.310		5901999
1,2,3,6,7,8-Hexa CDF **	pg	ND	2.8	30	6.0	0.100	0.280		5901999
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.4	30	6.0	0.100	0.340		5901999
1,2,3,7,8,9-Hexa CDF **	pg	ND	3.8	30	6.0	0.100	0.380		5901999
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	2.8	30	9.0	0.0100	0.0280		5901999
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	3.9	30	6.0	0.0100	0.0390		5901999
Octa CDF **	pg	ND (1)	4.6	300	15	0.000300	0.00138		5901999
Total Tetra CDF **	pg	ND	3.5	30	N/A			0	5901999
Total Penta CDF **	pg	ND	3.4	30	N/A			0	5901999
Total Hexa CDF **	pg	ND	3.2	30	N/A			0	5901999
Total Hepta CDF **	pg	ND	3.2	30	N/A			0	5901999
Toxic Equivalency	pg	7.3	3.5	N/A	N/A				5901999

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

ND = Not detected

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

(1) RT>2 seconds - PCDD/DF analysis-Peak maxima of monitored ions exceeds 2 seconds

Maxxam Job #: B8X0068
Report Date: 2019/01/03

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA809							
Sampling Date		2018/12/06							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	**OPG-DEC06 PUF (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
TOTAL TOXIC EQUIVALENCY	pg						14.2		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	84							5901999
C13-1234678 HeptaCDF **	%	71							5901999
C13-123478 HexaCDD *	%	125							5901999
C13-123478 HexaCDF **	%	119							5901999
C13-1234789 HeptaCDF **	%	106							5901999
C13-123678 HexaCDD *	%	77							5901999
C13-123678 HexaCDF **	%	66							5901999
C13-12378 PentaCDD *	%	98							5901999
C13-12378 PentaCDF **	%	78							5901999
C13-123789 HexaCDF **	%	74							5901999
C13-23478 PentaCDF **	%	116							5901999
C13-2378 TetraCDD *	%	95							5901999
C13-2378 TetraCDF **	%	74							5901999
C13-OCDD *	%	110							5901999
Cl37-2378 TetraCDD *	%	86							5901999

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8X0068
Report Date: 2019/01/03

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA810							
Sampling Date		2018/12/06							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	COVE-DEC06 PUF (2 SAMPLES)	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	ND	3.3	30	6.0	1.00	3.30		5901999
1,2,3,7,8-Penta CDD *	pg	ND	3.3	30	6.0	1.00	3.30		5901999
1,2,3,4,7,8-Hexa CDD *	pg	ND	3.3	30	6.0	0.100	0.330		5901999
1,2,3,6,7,8-Hexa CDD *	pg	ND	2.9	30	6.0	0.100	0.290		5901999
1,2,3,7,8,9-Hexa CDD *	pg	3.6	2.9	30	6.0	0.100	0.360		5901999
1,2,3,4,6,7,8-Hepta CDD *	pg	20.7	3.3	30	9.0	0.0100	0.207		5901999
Octa CDD *	pg	59.9	3.3	300	9.0	0.000300	0.0180		5901999
Total Tetra CDD *	pg	ND	3.3	30	N/A			0	5901999
Total Penta CDD *	pg	ND	3.3	30	N/A			0	5901999
Total Hexa CDD *	pg	9.7	3.0	30	N/A			2	5901999
Total Hepta CDD *	pg	46.2	3.3	30	N/A			2	5901999
2,3,7,8-Tetra CDF **	pg	ND	3.4	30	6.0	0.100	0.340		5901999
1,2,3,7,8-Penta CDF **	pg	ND	3.0	30	6.0	0.0300	0.0900		5901999
2,3,4,7,8-Penta CDF **	pg	ND	3.1	30	6.0	0.300	0.930		5901999
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.1	30	6.0	0.100	0.310		5901999
1,2,3,6,7,8-Hexa CDF **	pg	ND	2.8	30	6.0	0.100	0.280		5901999
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.4	30	6.0	0.100	0.340		5901999
1,2,3,7,8,9-Hexa CDF **	pg	ND	3.8	30	6.0	0.100	0.380		5901999
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	2.6	30	9.0	0.0100	0.0260		5901999
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	3.6	30	6.0	0.0100	0.0360		5901999
Octa CDF **	pg	ND	3.3	300	15	0.000300	0.000990		5901999
Total Tetra CDF **	pg	ND	3.4	30	N/A			0	5901999
Total Penta CDF **	pg	ND	3.0	30	N/A			0	5901999
Total Hexa CDF **	pg	ND	3.3	30	N/A			0	5901999
Total Hepta CDF **	pg	ND	3.0	30	N/A			0	5901999
Toxic Equivalency	pg	ND	3.4	N/A	N/A				5901999
TOTAL TOXIC EQUIVALENCY	pg						10.5		

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

ND = Not detected

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8X0068
Report Date: 2019/01/03

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA810							
Sampling Date		2018/12/06							
COC Number		na				**TOXIC EQUIVALENCY**		# of	
	UNITS	**COVE-DEC06 PUF (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	85							5901999
C13-1234678 HeptaCDF **	%	70							5901999
C13-123478 HexaCDD *	%	129							5901999
C13-123478 HexaCDF **	%	118							5901999
C13-1234789 HeptaCDF **	%	118							5901999
C13-123678 HexaCDD *	%	78							5901999
C13-123678 HexaCDF **	%	69							5901999
C13-12378 PentaCDD *	%	108							5901999
C13-12378 PentaCDF **	%	84							5901999
C13-123789 HexaCDF **	%	70							5901999
C13-23478 PentaCDF **	%	117							5901999
C13-2378 TetraCDD *	%	106							5901999
C13-2378 TetraCDF **	%	83							5901999
C13-OCDD *	%	115							5901999
Cl37-2378 TetraCDD *	%	86							5901999

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B8X0068
Report Date: 2019/01/03

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA811							
Sampling Date		2018/12/06							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	BEACH-DEC06 PUF (2 SAMPLES)	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	ND	3.5	30	6.0	1.00	3.50		5901999
1,2,3,7,8-Penta CDD *	pg	ND	3.2	30	6.0	1.00	3.20		5901999
1,2,3,4,7,8-Hexa CDD *	pg	ND	3.3	30	6.0	0.100	0.330		5901999
1,2,3,6,7,8-Hexa CDD *	pg	ND	3.4	30	6.0	0.100	0.340		5901999
1,2,3,7,8,9-Hexa CDD *	pg	ND (1)	3.7	30	6.0	0.100	0.370		5901999
1,2,3,4,6,7,8-Hepta CDD *	pg	22.9	3.4	30	9.0	0.0100	0.229		5901999
Octa CDD *	pg	74.6	3.0	300	9.0	0.000300	0.0224		5901999
Total Tetra CDD *	pg	ND (1)	6.8	30	N/A			0	5901999
Total Penta CDD *	pg	ND (1)	5.2	30	N/A			0	5901999
Total Hexa CDD *	pg	15.8	3.3	30	N/A			2	5901999
Total Hepta CDD *	pg	50.1	3.4	30	N/A			2	5901999
2,3,7,8-Tetra CDF **	pg	ND	3.3	30	6.0	0.100	0.330		5901999
1,2,3,7,8-Penta CDF **	pg	ND	3.3	30	6.0	0.0300	0.0990		5901999
2,3,4,7,8-Penta CDF **	pg	ND	3.3	30	6.0	0.300	0.990		5901999
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.4	30	6.0	0.100	0.340		5901999
1,2,3,6,7,8-Hexa CDF **	pg	ND	3.4	30	6.0	0.100	0.340		5901999
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.6	30	6.0	0.100	0.360		5901999
1,2,3,7,8,9-Hexa CDF **	pg	ND	3.9	30	6.0	0.100	0.390		5901999
1,2,3,4,6,7,8-Hepta CDF **	pg	ND (1)	3.8	30	9.0	0.0100	0.0380		5901999
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	3.5	30	6.0	0.0100	0.0350		5901999
Octa CDF **	pg	4.5	3.2	300	15	0.000300	0.00135		5901999
Total Tetra CDF **	pg	ND	3.3	30	N/A			0	5901999
Total Penta CDF **	pg	ND	3.3	30	N/A			0	5901999
Total Hexa CDF **	pg	ND	3.6	30	N/A			0	5901999
Total Hepta CDF **	pg	ND (1)	4.2	30	N/A			0	5901999
Toxic Equivalency	pg	ND	3.3	N/A	N/A				5901999

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

ND = Not detected

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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Maxxam Job #: B8X0068
Report Date: 2019/01/03

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA811							
Sampling Date		2018/12/06							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	**BEACH-DEC06 PUF (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
TOTAL TOXIC EQUIVALENCY	pg						10.9		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	100							5901999
C13-1234678 HeptaCDF **	%	90							5901999
C13-123478 HexaCDD *	%	113							5901999
C13-123478 HexaCDF **	%	104							5901999
C13-1234789 HeptaCDF **	%	102							5901999
C13-123678 HexaCDD *	%	88							5901999
C13-123678 HexaCDF **	%	95							5901999
C13-12378 PentaCDD *	%	90							5901999
C13-12378 PentaCDF **	%	92							5901999
C13-123789 HexaCDF **	%	81							5901999
C13-23478 PentaCDF **	%	114							5901999
C13-2378 TetraCDD *	%	97							5901999
C13-2378 TetraCDF **	%	94							5901999
C13-OCDD *	%	93							5901999
Cl37-2378 TetraCDD *	%	98							5901999

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

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Report Date: 2019/01/03

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA812							
Sampling Date		2018/12/07							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	OPG-DEC07 PUF (2 SAMPLES)	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	ND	3.6	30	6.0	1.00	3.60		5901999
1,2,3,7,8-Penta CDD *	pg	ND	3.1	30	6.0	1.00	3.10		5901999
1,2,3,4,7,8-Hexa CDD *	pg	ND	3.5	30	6.0	0.100	0.350		5901999
1,2,3,6,7,8-Hexa CDD *	pg	ND (1)	4.2	30	6.0	0.100	0.420		5901999
1,2,3,7,8,9-Hexa CDD *	pg	5.6	3.2	30	6.0	0.100	0.560		5901999
1,2,3,4,6,7,8-Hepta CDD *	pg	38.0	3.1	30	9.0	0.0100	0.380		5901999
Octa CDD *	pg	75.0	3.4	300	9.0	0.000300	0.0225		5901999
Total Tetra CDD *	pg	ND (1)	4.8	30	N/A			0	5901999
Total Penta CDD *	pg	ND (1)	3.9	30	N/A			1	5901999
Total Hexa CDD *	pg	24.1	3.4	30	N/A			2	5901999
Total Hepta CDD *	pg	86.6	3.1	30	N/A			2	5901999
2,3,7,8-Tetra CDF **	pg	3.4	3.1	30	6.0	0.100	0.340		5901999
1,2,3,7,8-Penta CDF **	pg	ND	3.6	30	6.0	0.0300	0.108		5901999
2,3,4,7,8-Penta CDF **	pg	ND	3.5	30	6.0	0.300	1.05		5901999
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.1	30	6.0	0.100	0.310		5901999
1,2,3,6,7,8-Hexa CDF **	pg	ND	3.0	30	6.0	0.100	0.300		5901999
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.2	30	6.0	0.100	0.320		5901999
1,2,3,7,8,9-Hexa CDF **	pg	ND	3.5	30	6.0	0.100	0.350		5901999
1,2,3,4,6,7,8-Hepta CDF **	pg	3.2	2.9	30	9.0	0.0100	0.0320		5901999
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	3.5	30	6.0	0.0100	0.0350		5901999
Octa CDF **	pg	4.0	3.4	300	15	0.000300	0.00120		5901999
Total Tetra CDF **	pg	3.4	3.1	30	N/A			1	5901999
Total Penta CDF **	pg	ND	3.5	30	N/A			0	5901999
Total Hexa CDF **	pg	ND	3.2	30	N/A			0	5901999
Total Hepta CDF **	pg	3.2	3.2	30	N/A			1	5901999
Toxic Equivalency	pg	ND	3.1	N/A	N/A				5901999

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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Maxxam
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Maxxam Job #: B8X0068
Report Date: 2019/01/03

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA812							
Sampling Date		2018/12/07							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	**OPG-DEC07 PUF (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
TOTAL TOXIC EQUIVALENCY	pg						11.3		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	89							5901999
C13-1234678 HeptaCDF **	%	90							5901999
C13-123478 HexaCDD *	%	119							5901999
C13-123478 HexaCDF **	%	103							5901999
C13-1234789 HeptaCDF **	%	94							5901999
C13-123678 HexaCDD *	%	94							5901999
C13-123678 HexaCDF **	%	100							5901999
C13-12378 PentaCDD *	%	107							5901999
C13-12378 PentaCDF **	%	94							5901999
C13-123789 HexaCDF **	%	80							5901999
C13-23478 PentaCDF **	%	110							5901999
C13-2378 TetraCDD *	%	98							5901999
C13-2378 TetraCDF **	%	91							5901999
C13-OCDD *	%	85							5901999
Cl37-2378 TetraCDD *	%	99							5901999

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

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DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA813							
Sampling Date		2018/12/07							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	COVE-DEC07 PUF (2 SAMPLES)	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	ND	3.2	30	6.0	1.00	3.20		5901999
1,2,3,7,8-Penta CDD *	pg	ND	3.4	30	6.0	1.00	3.40		5901999
1,2,3,4,7,8-Hexa CDD *	pg	ND	3.2	30	6.0	0.100	0.320		5901999
1,2,3,6,7,8-Hexa CDD *	pg	5.0	3.2	30	6.0	0.100	0.500		5901999
1,2,3,7,8,9-Hexa CDD *	pg	6.6	3.0	30	6.0	0.100	0.660		5901999
1,2,3,4,6,7,8-Hepta CDD *	pg	41.2	3.3	30	9.0	0.0100	0.412		5901999
Octa CDD *	pg	95.6	3.1	300	9.0	0.000300	0.0287		5901999
Total Tetra CDD *	pg	ND (1)	5.4	30	N/A			0	5901999
Total Penta CDD *	pg	ND	6.2	30	N/A			0	5901999
Total Hexa CDD *	pg	42.4	3.1	30	N/A			4	5901999
Total Hepta CDD *	pg	95.6	3.3	30	N/A			2	5901999
2,3,7,8-Tetra CDF **	pg	ND	3.2	30	6.0	0.100	0.320		5901999
1,2,3,7,8-Penta CDF **	pg	ND	3.2	30	6.0	0.0300	0.0960		5901999
2,3,4,7,8-Penta CDF **	pg	ND	3.2	30	6.0	0.300	0.960		5901999
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.0	30	6.0	0.100	0.300		5901999
1,2,3,6,7,8-Hexa CDF **	pg	ND	3.0	30	6.0	0.100	0.300		5901999
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.2	30	6.0	0.100	0.320		5901999
1,2,3,7,8,9-Hexa CDF **	pg	ND	3.5	30	6.0	0.100	0.350		5901999
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	2.9	30	9.0	0.0100	0.0290		5901999
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	3.6	30	6.0	0.0100	0.0360		5901999
Octa CDF **	pg	ND (1)	4.5	300	15	0.000300	0.00135		5901999
Total Tetra CDF **	pg	ND	3.2	30	N/A			0	5901999
Total Penta CDF **	pg	ND	3.2	30	N/A			0	5901999
Total Hexa CDF **	pg	ND	3.1	30	N/A			0	5901999
Total Hepta CDF **	pg	ND	3.2	30	N/A			0	5901999
Toxic Equivalency	pg	ND	3.2	N/A	N/A				5901999
TOTAL TOXIC EQUIVALENCY	pg						11.2		

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA813							
Sampling Date		2018/12/07							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	**COVE-DEC07 PUF (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	89							5901999
C13-1234678 HeptaCDF **	%	85							5901999
C13-123478 HexaCDD *	%	110							5901999
C13-123478 HexaCDF **	%	107							5901999
C13-1234789 HeptaCDF **	%	95							5901999
C13-123678 HexaCDD *	%	96							5901999
C13-123678 HexaCDF **	%	85							5901999
C13-12378 PentaCDD *	%	97							5901999
C13-12378 PentaCDF **	%	98							5901999
C13-123789 HexaCDF **	%	80							5901999
C13-23478 PentaCDF **	%	107							5901999
C13-2378 TetraCDD *	%	106							5901999
C13-2378 TetraCDF **	%	100							5901999
C13-OCDD *	%	84							5901999
Cl37-2378 TetraCDD *	%	91							5901999

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

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Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA814							
Sampling Date		2018/12/07							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	**BEACH-DEC07 PUF (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	ND	3.2	30	6.0	1.00	3.20		5901999
1,2,3,7,8-Penta CDD *	pg	ND	3.3	30	6.0	1.00	3.30		5901999
1,2,3,4,7,8-Hexa CDD *	pg	ND	3.3	30	6.0	0.100	0.330		5901999
1,2,3,6,7,8-Hexa CDD *	pg	4.2	3.4	30	6.0	0.100	0.420		5901999
1,2,3,7,8,9-Hexa CDD *	pg	ND (1)	5.7	30	6.0	0.100	0.570		5901999
1,2,3,4,6,7,8-Hepta CDD *	pg	35.5	3.4	30	9.0	0.0100	0.355		5901999
Octa CDD *	pg	84.5	3.2	300	9.0	0.000300	0.0254		5901999
Total Tetra CDD *	pg	ND (1)	5.5	30	N/A			0	5901999
Total Penta CDD *	pg	ND (1)	3.5	30	N/A			0	5901999
Total Hexa CDD *	pg	36.4	3.3	30	N/A			3	5901999
Total Hepta CDD *	pg	82.1	3.4	30	N/A			2	5901999
2,3,7,8-Tetra CDF **	pg	ND	3.3	30	6.0	0.100	0.330		5901999
1,2,3,7,8-Penta CDF **	pg	ND	3.1	30	6.0	0.0300	0.0930		5901999
2,3,4,7,8-Penta CDF **	pg	ND	3.1	30	6.0	0.300	0.930		5901999
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.2	30	6.0	0.100	0.320		5901999
1,2,3,6,7,8-Hexa CDF **	pg	ND	3.2	30	6.0	0.100	0.320		5901999
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.4	30	6.0	0.100	0.340		5901999
1,2,3,7,8,9-Hexa CDF **	pg	ND	3.7	30	6.0	0.100	0.370		5901999
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	2.9	30	9.0	0.0100	0.0290		5901999
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	3.6	30	6.0	0.0100	0.0360		5901999
Octa CDF **	pg	ND	3.5	300	15	0.000300	0.00105		5901999
Total Tetra CDF **	pg	ND	3.3	30	N/A			0	5901999
Total Penta CDF **	pg	ND	3.1	30	N/A			0	5901999
Total Hexa CDF **	pg	ND	3.3	30	N/A			0	5901999
Total Hepta CDF **	pg	ND	3.3	30	N/A			0	5901999
Toxic Equivalency	pg	ND	3.3	N/A	N/A				5901999

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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Maxxam Job #: B8X0068
Report Date: 2019/01/03

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA814							
Sampling Date		2018/12/07							
COC Number		na				**TOXIC EQUIVALENCY**		# of	
	UNITS	**BEACH-DEC07 PUF (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
TOTAL TOXIC EQUIVALENCY	pg						11.0		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	97							5901999
C13-1234678 HeptaCDF **	%	98							5901999
C13-123478 HexaCDD *	%	116							5901999
C13-123478 HexaCDF **	%	113							5901999
C13-1234789 HeptaCDF **	%	95							5901999
C13-123678 HexaCDD *	%	104							5901999
C13-123678 HexaCDF **	%	98							5901999
C13-12378 PentaCDD *	%	124							5901999
C13-12378 PentaCDF **	%	126							5901999
C13-123789 HexaCDF **	%	83							5901999
C13-23478 PentaCDF **	%	110							5901999
C13-2378 TetraCDD *	%	117							5901999
C13-2378 TetraCDF **	%	112							5901999
C13-OCDD *	%	91							5901999
Cl37-2378 TetraCDD *	%	93							5901999

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

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DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA815							
Sampling Date		2018/12/08							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	**OPG-DEC08 PUF (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	ND	3.0	30	6.0	1.00	3.00		5901999
1,2,3,7,8-Penta CDD *	pg	ND	3.2	30	6.0	1.00	3.20		5901999
1,2,3,4,7,8-Hexa CDD *	pg	ND	3.3	30	6.0	0.100	0.330		5901999
1,2,3,6,7,8-Hexa CDD *	pg	ND	3.4	30	6.0	0.100	0.340		5901999
1,2,3,7,8,9-Hexa CDD *	pg	ND	3.1	30	6.0	0.100	0.310		5901999
1,2,3,4,6,7,8-Hepta CDD *	pg	14.8	3.2	30	9.0	0.0100	0.148		5901999
Octa CDD *	pg	47.0	3.2	300	9.0	0.000300	0.0141		5901999
Total Tetra CDD *	pg	ND (1)	5.6	30	N/A			0	5901999
Total Penta CDD *	pg	ND (1)	4.6	30	N/A			0	5901999
Total Hexa CDD *	pg	3.8	3.3	30	N/A			1	5901999
Total Hepta CDD *	pg	31.8	3.2	30	N/A			2	5901999
2,3,7,8-Tetra CDF **	pg	ND	4.1	30	6.0	0.100	0.410		5901999
1,2,3,7,8-Penta CDF **	pg	ND	3.4	30	6.0	0.0300	0.102		5901999
2,3,4,7,8-Penta CDF **	pg	ND	3.4	30	6.0	0.300	1.02		5901999
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.1	30	6.0	0.100	0.310		5901999
1,2,3,6,7,8-Hexa CDF **	pg	ND	3.1	30	6.0	0.100	0.310		5901999
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.3	30	6.0	0.100	0.330		5901999
1,2,3,7,8,9-Hexa CDF **	pg	ND	3.6	30	6.0	0.100	0.360		5901999
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	2.8	30	9.0	0.0100	0.0280		5901999
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	3.4	30	6.0	0.0100	0.0340		5901999
Octa CDF **	pg	ND	3.5	300	15	0.000300	0.00105		5901999
Total Tetra CDF **	pg	ND (1)	4.1	30	N/A			0	5901999
Total Penta CDF **	pg	ND	3.4	30	N/A			0	5901999
Total Hexa CDF **	pg	ND	3.3	30	N/A			0	5901999
Total Hepta CDF **	pg	ND	3.1	30	N/A			0	5901999
Toxic Equivalency	pg	ND	4.1	N/A	N/A				5901999
TOTAL TOXIC EQUIVALENCY	pg						10.2		

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B8X0068
Report Date: 2019/01/03

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA815							
Sampling Date		2018/12/08							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	**OPG-DEC08 PUF (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	106							5901999
C13-1234678 HeptaCDF **	%	91							5901999
C13-123478 HexaCDD *	%	111							5901999
C13-123478 HexaCDF **	%	108							5901999
C13-1234789 HeptaCDF **	%	96							5901999
C13-123678 HexaCDD *	%	99							5901999
C13-123678 HexaCDF **	%	94							5901999
C13-12378 PentaCDD *	%	128							5901999
C13-12378 PentaCDF **	%	98							5901999
C13-123789 HexaCDF **	%	80							5901999
C13-23478 PentaCDF **	%	130							5901999
C13-2378 TetraCDD *	%	103							5901999
C13-2378 TetraCDF **	%	95							5901999
C13-OCDD *	%	87							5901999
Cl37-2378 TetraCDD *	%	98							5901999

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

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Report Date: 2019/01/03

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA816							
Sampling Date		2018/12/08							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	COVE-DEC08 PUF (2 SAMPLES)	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	ND	3.1	30	6.0	1.00	3.10		5901999
1,2,3,7,8-Penta CDD *	pg	ND	3.3	30	6.0	1.00	3.30		5901999
1,2,3,4,7,8-Hexa CDD *	pg	ND	3.5	30	6.0	0.100	0.350		5901999
1,2,3,6,7,8-Hexa CDD *	pg	ND	3.5	30	6.0	0.100	0.350		5901999
1,2,3,7,8,9-Hexa CDD *	pg	ND	3.2	30	6.0	0.100	0.320		5901999
1,2,3,4,6,7,8-Hepta CDD *	pg	17.2	3.3	30	9.0	0.0100	0.172		5901999
Octa CDD *	pg	54.3	3.1	300	9.0	0.000300	0.0163		5901999
Total Tetra CDD *	pg	ND (1)	5.7	30	N/A			0	5901999
Total Penta CDD *	pg	ND	3.3	30	N/A			0	5901999
Total Hexa CDD *	pg	12.0	3.4	30	N/A			2	5901999
Total Hepta CDD *	pg	40.6	3.3	30	N/A			2	5901999
2,3,7,8-Tetra CDF **	pg	ND	3.1	30	6.0	0.100	0.310		5901999
1,2,3,7,8-Penta CDF **	pg	ND	3.2	30	6.0	0.0300	0.0960		5901999
2,3,4,7,8-Penta CDF **	pg	ND	3.2	30	6.0	0.300	0.960		5901999
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.1	30	6.0	0.100	0.310		5901999
1,2,3,6,7,8-Hexa CDF **	pg	ND	3.0	30	6.0	0.100	0.300		5901999
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.2	30	6.0	0.100	0.320		5901999
1,2,3,7,8,9-Hexa CDF **	pg	ND	3.5	30	6.0	0.100	0.350		5901999
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	2.8	30	9.0	0.0100	0.0280		5901999
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	3.4	30	6.0	0.0100	0.0340		5901999
Octa CDF **	pg	ND	3.4	300	15	0.000300	0.00102		5901999
Total Tetra CDF **	pg	ND	3.1	30	N/A			0	5901999
Total Penta CDF **	pg	ND	3.2	30	N/A			0	5901999
Total Hexa CDF **	pg	ND	3.2	30	N/A			0	5901999
Total Hepta CDF **	pg	ND	3.1	30	N/A			0	5901999
Toxic Equivalency	pg	ND	3.1	N/A	N/A				5901999
TOTAL TOXIC EQUIVALENCY	pg						10.3		

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B8X0068
Report Date: 2019/01/03

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA816							
Sampling Date		2018/12/08							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	**COVE-DEC08 PUF (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	88							5901999
C13-1234678 HeptaCDF **	%	90							5901999
C13-123478 HexaCDD *	%	123							5901999
C13-123478 HexaCDF **	%	99							5901999
C13-1234789 HeptaCDF **	%	94							5901999
C13-123678 HexaCDD *	%	90							5901999
C13-123678 HexaCDF **	%	101							5901999
C13-12378 PentaCDD *	%	119							5901999
C13-12378 PentaCDF **	%	112							5901999
C13-123789 HexaCDF **	%	81							5901999
C13-23478 PentaCDF **	%	111							5901999
C13-2378 TetraCDD *	%	105							5901999
C13-2378 TetraCDF **	%	97							5901999
C13-OCDD *	%	86							5901999
Cl37-2378 TetraCDD *	%	88							5901999

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8X0068
Report Date: 2019/01/03

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA817							
Sampling Date		2018/12/08							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	BEACH-DEC08 PUF (2 SAMPLES)	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	ND	3.3	30	6.0	1.00	3.30		5901999
1,2,3,7,8-Penta CDD *	pg	ND	3.4	30	6.0	1.00	3.40		5901999
1,2,3,4,7,8-Hexa CDD *	pg	ND	3.3	30	6.0	0.100	0.330		5901999
1,2,3,6,7,8-Hexa CDD *	pg	ND	3.4	30	6.0	0.100	0.340		5901999
1,2,3,7,8,9-Hexa CDD *	pg	ND	3.1	30	6.0	0.100	0.310		5901999
1,2,3,4,6,7,8-Hepta CDD *	pg	17.1	3.1	30	9.0	0.0100	0.171		5901999
Octa CDD *	pg	53.7	3.2	300	9.0	0.000300	0.0161		5901999
Total Tetra CDD *	pg	ND (1)	6.6	30	N/A			0	5901999
Total Penta CDD *	pg	ND (1)	3.5	30	N/A			0	5901999
Total Hexa CDD *	pg	9.9	3.2	30	N/A			2	5901999
Total Hepta CDD *	pg	41.7	3.1	30	N/A			2	5901999
2,3,7,8-Tetra CDF **	pg	6.2	3.3	30	6.0	0.100	0.620		5901999
1,2,3,7,8-Penta CDF **	pg	ND	3.1	30	6.0	0.0300	0.0930		5901999
2,3,4,7,8-Penta CDF **	pg	ND	3.1	30	6.0	0.300	0.930		5901999
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.1	30	6.0	0.100	0.310		5901999
1,2,3,6,7,8-Hexa CDF **	pg	ND	3.1	30	6.0	0.100	0.310		5901999
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.3	30	6.0	0.100	0.330		5901999
1,2,3,7,8,9-Hexa CDF **	pg	ND	3.6	30	6.0	0.100	0.360		5901999
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	3.0	30	9.0	0.0100	0.0300		5901999
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	3.7	30	6.0	0.0100	0.0370		5901999
Octa CDF **	pg	ND (1)	3.5	300	15	0.000300	0.00105		5901999
Total Tetra CDF **	pg	10.2	3.3	30	N/A			2	5901999
Total Penta CDF **	pg	ND	3.1	30	N/A			0	5901999
Total Hexa CDF **	pg	ND	3.2	30	N/A			0	5901999
Total Hepta CDF **	pg	ND	3.3	30	N/A			0	5901999
Toxic Equivalency	pg	ND	3.3	N/A	N/A				5901999
TOTAL TOXIC EQUIVALENCY	pg						10.9		

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan
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Maxxam
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Maxxam Job #: B8X0068
Report Date: 2019/01/03

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA817							
Sampling Date		2018/12/08							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	BEACH-DEC08 PUF (2 SAMPLES)	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	89							5901999
C13-1234678 HeptaCDF **	%	90							5901999
C13-123478 HexaCDD *	%	110							5901999
C13-123478 HexaCDF **	%	108							5901999
C13-1234789 HeptaCDF **	%	95							5901999
C13-123678 HexaCDD *	%	99							5901999
C13-123678 HexaCDF **	%	96							5901999
C13-12378 PentaCDD *	%	123							5901999
C13-12378 PentaCDF **	%	118							5901999
C13-123789 HexaCDF **	%	80							5901999
C13-23478 PentaCDF **	%	106							5901999
C13-2378 TetraCDD *	%	105							5901999
C13-2378 TetraCDF **	%	100							5901999
C13-OCDD *	%	89							5901999
Cl37-2378 TetraCDD *	%	92							5901999

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

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Report Date: 2019/01/03

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Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA818							
Sampling Date									
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	BLANK PUF (2 SAMPLES)	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	ND	3.2	30	6.0	1.00	3.20		5901999
1,2,3,7,8-Penta CDD *	pg	ND	3.5	30	6.0	1.00	3.50		5901999
1,2,3,4,7,8-Hexa CDD *	pg	ND	3.3	30	6.0	0.100	0.330		5901999
1,2,3,6,7,8-Hexa CDD *	pg	ND	3.3	30	6.0	0.100	0.330		5901999
1,2,3,7,8,9-Hexa CDD *	pg	ND	3.0	30	6.0	0.100	0.300		5901999
1,2,3,4,6,7,8-Hepta CDD *	pg	ND	3.0	30	9.0	0.0100	0.0300		5901999
Octa CDD *	pg	ND	3.2	300	9.0	0.000300	0.000960		5901999
Total Tetra CDD *	pg	ND (1)	4.5	30	N/A			0	5901999
Total Penta CDD *	pg	ND (1)	3.8	30	N/A			0	5901999
Total Hexa CDD *	pg	ND (1)	11	30	N/A			0	5901999
Total Hepta CDD *	pg	ND	3.0	30	N/A			0	5901999
2,3,7,8-Tetra CDF **	pg	ND	3.3	30	6.0	0.100	0.330		5901999
1,2,3,7,8-Penta CDF **	pg	ND	3.2	30	6.0	0.0300	0.0960		5901999
2,3,4,7,8-Penta CDF **	pg	ND	3.2	30	6.0	0.300	0.960		5901999
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.3	30	6.0	0.100	0.330		5901999
1,2,3,6,7,8-Hexa CDF **	pg	ND	3.3	30	6.0	0.100	0.330		5901999
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.5	30	6.0	0.100	0.350		5901999
1,2,3,7,8,9-Hexa CDF **	pg	ND	3.8	30	6.0	0.100	0.380		5901999
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	1.9	30	9.0	0.0100	0.0190		5901999
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	2.4	30	6.0	0.0100	0.0240		5901999
Octa CDF **	pg	ND	3.2	300	15	0.000300	0.000960		5901999
Total Tetra CDF **	pg	ND	3.3	30	N/A			0	5901999
Total Penta CDF **	pg	ND	3.2	30	N/A			0	5901999
Total Hexa CDF **	pg	ND	3.4	30	N/A			0	5901999
Total Hepta CDF **	pg	ND	2.1	30	N/A			0	5901999
Toxic Equivalency	pg	ND	3.3	N/A	N/A				5901999
TOTAL TOXIC EQUIVALENCY	pg						10.5		

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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Maxxam Job #: B8X0068
Report Date: 2019/01/03

RWDI Air Inc
Site Location: ST. MARYS

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		INA818							
Sampling Date									
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	**BLANK PUF (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	101							5901999
C13-1234678 HeptaCDF **	%	90							5901999
C13-123478 HexaCDD *	%	116							5901999
C13-123478 HexaCDF **	%	102							5901999
C13-1234789 HeptaCDF **	%	96							5901999
C13-123678 HexaCDD *	%	97							5901999
C13-123678 HexaCDF **	%	102							5901999
C13-12378 PentaCDD *	%	102							5901999
C13-12378 PentaCDF **	%	99							5901999
C13-123789 HexaCDF **	%	82							5901999
C13-23478 PentaCDF **	%	113							5901999
C13-2378 TetraCDD *	%	102							5901999
C13-2378 TetraCDF **	%	93							5901999
C13-OCDD *	%	86							5901999
Cl37-2378 TetraCDD *	%	93							5901999

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B8X0068
Report Date: 2019/01/03

RWDI Air Inc
Site Location: ST. MARYS

TEST SUMMARY

Maxxam ID: INA803 **Collected:** 2018/12/04
Sample ID: OPG-DEC04 PUF (2 SAMPLES) **Shipped:**
Matrix: PUF AND FILTER **Received:** 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5901999	2018/12/11	2018/12/21	Owen Cosby
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5882221	2018/12/11	2018/12/17	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5882215	2018/12/11	2018/12/24	Fan (Carrie) Jiang

Maxxam ID: INA804 **Collected:** 2018/12/04
Sample ID: COVE-DEC04 PUF (2 SAMPLES) **Shipped:**
Matrix: PUF AND FILTER **Received:** 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5901999	2018/12/11	2018/12/21	Owen Cosby
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5882221	2018/12/11	2018/12/17	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5882215	2018/12/11	2018/12/24	Fan (Carrie) Jiang

Maxxam ID: INA805 **Collected:** 2018/12/04
Sample ID: BEACH-DEC04 PUF (2 SAMPLES) **Shipped:**
Matrix: PUF AND FILTER **Received:** 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5901999	2018/12/11	2018/12/21	Owen Cosby
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5882221	2018/12/11	2018/12/17	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5882215	2018/12/11	2018/12/24	Fan (Carrie) Jiang

Maxxam ID: INA806 **Collected:** 2018/12/05
Sample ID: OPG-DEC05 PUF (2 SAMPLES) **Shipped:**
Matrix: PUF AND FILTER **Received:** 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5901999	2018/12/11	2018/12/21	Owen Cosby
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5882221	2018/12/11	2018/12/17	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5882215	2018/12/11	2018/12/24	Fan (Carrie) Jiang

Maxxam ID: INA807 **Collected:** 2018/12/05
Sample ID: COVE-DEC05 PUF (2 SAMPLES) **Shipped:**
Matrix: PUF AND FILTER **Received:** 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5901999	2018/12/11	2018/12/21	Owen Cosby
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5882221	2018/12/11	2018/12/17	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5882215	2018/12/11	2018/12/24	Fan (Carrie) Jiang

Maxxam ID: INA808 **Collected:** 2018/12/05
Sample ID: BEACH-DEC05 PUF (2 SAMPLES) **Shipped:**
Matrix: PUF AND FILTER **Received:** 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5901999	2018/12/11	2018/12/21	Owen Cosby
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5882221	2018/12/11	2018/12/18	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5882215	2018/12/11	2018/12/24	Fan (Carrie) Jiang

Maxxam Job #: B8X0068
Report Date: 2019/01/03

RWDI Air Inc
Site Location: ST. MARYS

TEST SUMMARY

Maxxam ID: INA809
Sample ID: OPG-DEC06 PUF (2 SAMPLES)
Matrix: PUF AND FILTER

Collected: 2018/12/06
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5901999	2018/12/11	2018/12/21	Owen Cosby
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5882221	2018/12/11	2018/12/18	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5882215	2018/12/11	2018/12/24	Fan (Carrie) Jiang

Maxxam ID: INA810
Sample ID: COVE-DEC06 PUF (2 SAMPLES)
Matrix: PUF AND FILTER

Collected: 2018/12/06
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5901999	2018/12/11	2018/12/21	Owen Cosby
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5882221	2018/12/11	2018/12/18	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5882215	2018/12/11	2018/12/24	Fan (Carrie) Jiang

Maxxam ID: INA811
Sample ID: BEACH-DEC06 PUF (2 SAMPLES)
Matrix: PUF AND FILTER

Collected: 2018/12/06
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5901999	2018/12/11	2018/12/22	Owen Cosby
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5882221	2018/12/11	2018/12/18	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5882215	2018/12/11	2018/12/24	Fan (Carrie) Jiang

Maxxam ID: INA812
Sample ID: OPG-DEC07 PUF (2 SAMPLES)
Matrix: PUF AND FILTER

Collected: 2018/12/07
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5901999	2018/12/11	2018/12/22	Owen Cosby
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5882221	2018/12/11	2018/12/18	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5882215	2018/12/11	2018/12/24	Fan (Carrie) Jiang

Maxxam ID: INA813
Sample ID: COVE-DEC07 PUF (2 SAMPLES)
Matrix: PUF AND FILTER

Collected: 2018/12/07
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5901999	2018/12/11	2018/12/22	Owen Cosby
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5882221	2018/12/11	2018/12/18	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5882215	2018/12/11	2018/12/25	Fan (Carrie) Jiang

Maxxam ID: INA814
Sample ID: BEACH-DEC07 PUF (2 SAMPLES)
Matrix: PUF AND FILTER

Collected: 2018/12/07
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5901999	2018/12/11	2018/12/22	Owen Cosby
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5882221	2018/12/11	2018/12/18	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5882215	2018/12/11	2018/12/25	Fan (Carrie) Jiang

Maxxam Job #: B8X0068
Report Date: 2019/01/03

RWDI Air Inc
Site Location: ST. MARYS

TEST SUMMARY

Maxxam ID: INA815
Sample ID: OPG-DEC08 PUF (2 SAMPLES)
Matrix: PUF AND FILTER

Collected: 2018/12/08
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5901999	2018/12/11	2018/12/22	Owen Cosby
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5882221	2018/12/11	2018/12/18	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5882215	2018/12/11	2018/12/25	Fan (Carrie) Jiang

Maxxam ID: INA816
Sample ID: COVE-DEC08 PUF (2 SAMPLES)
Matrix: PUF AND FILTER

Collected: 2018/12/08
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5901999	2018/12/11	2018/12/22	Owen Cosby
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5882221	2018/12/11	2018/12/18	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5882215	2018/12/11	2018/12/25	Fan (Carrie) Jiang

Maxxam ID: INA817
Sample ID: BEACH-DEC08 PUF (2 SAMPLES)
Matrix: PUF AND FILTER

Collected: 2018/12/08
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5901999	2018/12/11	2018/12/22	Owen Cosby
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5882221	2018/12/11	2018/12/18	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5882215	2018/12/11	2018/12/25	Fan (Carrie) Jiang

Maxxam ID: INA818
Sample ID: BLANK PUF (2 SAMPLES)
Matrix: PUF AND FILTER

Collected:
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5901999	2018/12/11	2018/12/22	Owen Cosby
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5882221	2018/12/11	2018/12/18	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5882215	2018/12/11	2018/12/24	Fan (Carrie) Jiang

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GENERAL COMMENTS

Dibenzo(a,c) anthracene, Benzo(b)anthracene, Triphenylene and Picene : These parameters are not accredited for the submitted matrix. Triphenylene co-elutes with Chrysene and Dibenzo(a,c)anthracene co-elutes with Dibenz(a,h)anthracene. The data reported is the total of the 2 compounds if both are present.

Sample INA807 [COVE-DEC05 PUF (2 SAMPLES)] : Lost ~ 4 mL after cleanup

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5882215	FJI	Spiked Blank	D10-2-Methylnaphthalene	2018/12/24		68	%	50 - 150
			D10-Fluoranthene	2018/12/24		80	%	50 - 150
			D10-Phenanthrene	2018/12/24		70	%	50 - 150
			D12-Benzo(a)anthracene	2018/12/24		86	%	50 - 150
			D12-Benzo(a)pyrene	2018/12/24		90	%	50 - 150
			D12-Benzo(b)fluoranthene	2018/12/24		92	%	50 - 150
			D12-Benzo(ghi)perylene	2018/12/24		94	%	50 - 150
			D12-Benzo(k)fluoranthene	2018/12/24		108	%	50 - 150
			D12-Chrysene	2018/12/24		86	%	50 - 150
			D12-Indeno(1,2,3-cd)pyrene	2018/12/24		98	%	50 - 150
			D12-Perylene	2018/12/24		90	%	50 - 150
			D14-Dibenzo(a,h)anthracene	2018/12/24		92	%	50 - 150
			D8-Acenaphthylene	2018/12/24		66	%	50 - 150
			D8-Naphthalene	2018/12/24		70	%	50 - 150
			Acenaphthene	2018/12/24		70	%	60 - 130
			Acenaphthylene	2018/12/24		73	%	60 - 130
			Anthracene	2018/12/24		73	%	60 - 130
			Benzo(a)anthracene	2018/12/24		93	%	60 - 130
			Benzo(b)fluoranthene	2018/12/24		83	%	60 - 130
			Benzo(g,h,i)perylene	2018/12/24		93	%	60 - 130
			Benzo(k)fluoranthene	2018/12/24		105	%	60 - 130
			Chrysene	2018/12/24		93	%	60 - 130
			Dibenz(a,h)anthracene	2018/12/24		98	%	60 - 130
			Fluoranthene	2018/12/24		78	%	60 - 130
			Fluorene	2018/12/24		73	%	60 - 130
			Indeno(1,2,3-cd)pyrene	2018/12/24		98	%	60 - 130
			Naphthalene	2018/12/24		70	%	60 - 130
			Phenanthrene	2018/12/24		75	%	60 - 130
			Pyrene	2018/12/24		75	%	60 - 130
5882215	FJI	RPD	Acenaphthene	2018/12/24	19		%	50
			Acenaphthylene	2018/12/24	19		%	50
			Anthracene	2018/12/24	16		%	50
			Benzo(a)anthracene	2018/12/24	22		%	50
			Benzo(b)fluoranthene	2018/12/24	22		%	50
			Benzo(g,h,i)perylene	2018/12/24	20		%	50
			Benzo(k)fluoranthene	2018/12/24	19		%	50
			Chrysene	2018/12/24	20		%	50
			Dibenz(a,h)anthracene	2018/12/24	19		%	50
			Fluoranthene	2018/12/24	15		%	50
			Fluorene	2018/12/24	19		%	50
			Indeno(1,2,3-cd)pyrene	2018/12/24	19		%	50
			Naphthalene	2018/12/24	16		%	50
			Phenanthrene	2018/12/24	18		%	50
			Pyrene	2018/12/24	15		%	50
5882215	FJI	Method Blank	D10-2-Methylnaphthalene	2018/12/24		78	%	50 - 150
			D10-Fluoranthene	2018/12/24		86	%	50 - 150
			D10-Phenanthrene	2018/12/24		80	%	50 - 150
			D12-Benzo(a)anthracene	2018/12/24		102	%	50 - 150
			D12-Benzo(a)pyrene	2018/12/24		106	%	50 - 150
			D12-Benzo(b)fluoranthene	2018/12/24		106	%	50 - 150
			D12-Benzo(ghi)perylene	2018/12/24		108	%	50 - 150
			D12-Benzo(k)fluoranthene	2018/12/24		126	%	50 - 150
			D12-Chrysene	2018/12/24		102	%	50 - 150
			D12-Indeno(1,2,3-cd)pyrene	2018/12/24		114	%	50 - 150
			D12-Perylene	2018/12/24		106	%	50 - 150

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			D14-Dibenzo(a,h)anthracene	2018/12/24		106	%	50 - 150
			D8-Acenaphthylene	2018/12/24		78	%	50 - 150
			D8-Naphthalene	2018/12/24		80	%	50 - 150
			1-Methylnaphthalene	2018/12/24	ND, RDL=0.15		ug	
			1-Methylphenanthrene	2018/12/24	ND, RDL=0.15		ug	
			2-Chloronaphthalene	2018/12/24	ND, RDL=0.15		ug	
			2-Methylanthracene	2018/12/24	ND, RDL=0.15		ug	
			2-Methylnaphthalene	2018/12/24	ND, RDL=0.15		ug	
			3-Methylcholanthrene	2018/12/24	ND, RDL=3.0		ug	
			7,12-Dimethylbenzo(a)anthracene	2018/12/24	ND, RDL=0.60		ug	
			9,10-Dimethylanthracene	2018/12/24	ND, RDL=0.60		ug	
			Acenaphthene	2018/12/24	ND, RDL=0.075		ug	
			Acenaphthylene	2018/12/24	ND, RDL=0.075		ug	
			Anthracene	2018/12/24	ND, RDL=0.075		ug	
			Benzo(a)anthracene	2018/12/24	ND, RDL=0.075		ug	
			Benzo(a)fluorene	2018/12/24	ND, RDL=0.15		ug	
			Benzo(b)fluoranthene	2018/12/24	ND, RDL=0.075		ug	
			Benzo(b)fluorene	2018/12/24	ND, RDL=0.15		ug	
			Benzo(e)pyrene	2018/12/24	ND, RDL=0.15		ug	
			Benzo(g,h,i)perylene	2018/12/24	ND, RDL=0.075		ug	
			Benzo(k)fluoranthene	2018/12/24	ND, RDL=0.075		ug	
			Chrysene	2018/12/24	ND, RDL=0.075		ug	
			Coronene	2018/12/24	ND, RDL=0.15		ug	
			Dibenz(a,h)anthracene	2018/12/24	ND, RDL=0.075		ug	
			Dibenzo(a,c) anthracene + Picene	2018/12/24	ND, RDL=0.15		ug	
			Dibenzo(a,c)anthracene	2018/12/24	ND, RDL=0.15		ug	
			Dibenzo(a,e)pyrene	2018/12/24	ND, RDL=0.30		ug	
			Fluoranthene	2018/12/24	ND, RDL=0.075		ug	
			Fluorene	2018/12/24	ND, RDL=0.075		ug	

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Indeno(1,2,3-cd)pyrene	2018/12/24	ND, RDL=0.075		ug	
			Naphthalene	2018/12/24	ND, RDL=0.11		ug	
			Perylene	2018/12/24	ND, RDL=0.15		ug	
			Phenanthrene	2018/12/24	ND, RDL=0.075		ug	
			Picene	2018/12/24	ND, RDL=0.15		ug	
			Pyrene	2018/12/24	ND, RDL=0.075		ug	
			Tetralin	2018/12/24	ND, RDL=0.15		ug	
5882221	BY	Spiked Blank	Benzo(a)pyrene (13C4)	2018/12/17		104	%	50 - 150
			Benzo(a)pyrene	2018/12/17		122	%	60 - 140
5882221	BY	RPD	Benzo(a)pyrene	2018/12/17	8.5		%	50
5882221	BY	Method Blank	Benzo(a)pyrene (13C4)	2019/12/17		86	%	50 - 150
			Benzo(a)pyrene	2019/12/17	0.00078, RDL=0.030		ug	
5901999	OBC	Spiked Blank	C13-1234678 HeptaCDD	2018/12/22		99	%	25 - 130
			C13-1234678 HeptaCDF	2018/12/22		78	%	25 - 130
			C13-123678 HexaCDD	2018/12/22		77	%	40 - 130
			C13-123678 HexaCDF	2018/12/22		69	%	40 - 130
			C13-12378 PentaCDD	2018/12/22		105	%	40 - 130
			C13-12378 PentaCDF	2018/12/22		83	%	40 - 130
			C13-123789 HexaCDF	2018/12/22		71	%	70 - 130
			C13-2378 TetraCDD	2018/12/22		89	%	40 - 130
			C13-2378 TetraCDF	2018/12/22		70	%	40 - 130
			C13-OCDD	2018/12/22		132 (1)	%	25 - 130
			2,3,7,8-Tetra CDD	2018/12/22		93	%	80 - 140
			1,2,3,7,8-Penta CDD	2018/12/22		96	%	80 - 140
			1,2,3,4,7,8-Hexa CDD	2018/12/22		111	%	80 - 140
			1,2,3,6,7,8-Hexa CDD	2018/12/22		106	%	80 - 140
			1,2,3,7,8,9-Hexa CDD	2018/12/22		107	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDD	2018/12/22		103	%	80 - 140
			Octa CDD	2018/12/22		104	%	80 - 140
			2,3,7,8-Tetra CDF	2018/12/22		105	%	80 - 140
			1,2,3,7,8-Penta CDF	2018/12/22		93	%	80 - 140
			2,3,4,7,8-Penta CDF	2018/12/22		93	%	80 - 140
			1,2,3,4,7,8-Hexa CDF	2018/12/22		113	%	80 - 140
			1,2,3,6,7,8-Hexa CDF	2018/12/22		108	%	80 - 140
			2,3,4,6,7,8-Hexa CDF	2018/12/22		109	%	80 - 140
			1,2,3,7,8,9-Hexa CDF	2018/12/22		101	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDF	2018/12/22		103	%	80 - 140
			1,2,3,4,7,8,9-Hepta CDF	2018/12/22		106	%	80 - 140
			Octa CDF	2018/12/22		97	%	80 - 140
5901999	OBC	RPD	2,3,7,8-Tetra CDD	2018/12/22	1.1		%	20
			1,2,3,7,8-Penta CDD	2018/12/22	6.5		%	20
			1,2,3,4,7,8-Hexa CDD	2018/12/22	0.90		%	20
			1,2,3,6,7,8-Hexa CDD	2018/12/22	1.9		%	20
			1,2,3,7,8,9-Hexa CDD	2018/12/22	2.8		%	20
			1,2,3,4,6,7,8-Hepta CDD	2018/12/22	1.9		%	20
			Octa CDD	2018/12/22	0		%	20
			2,3,7,8-Tetra CDF	2018/12/22	0.95		%	20

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8-Penta CDF	2018/12/22	1.1		%	20
			2,3,4,7,8-Penta CDF	2018/12/22	2.1		%	20
			1,2,3,4,7,8-Hexa CDF	2018/12/22	1.8		%	20
			1,2,3,6,7,8-Hexa CDF	2018/12/22	0		%	20
			2,3,4,6,7,8-Hexa CDF	2018/12/22	7.9		%	20
			1,2,3,7,8,9-Hexa CDF	2018/12/22	6.7		%	20
			1,2,3,4,6,7,8-Hepta CDF	2018/12/22	3.0		%	20
			1,2,3,4,7,8,9-Hepta CDF	2018/12/22	5.8		%	20
			Octa CDF	2018/12/22	0		%	20
5901999	OBC	Method Blank	C13-1234678 HeptaCDD	2018/12/21		92	%	25 - 130
			C13-1234678 HeptaCDF	2018/12/21		77	%	25 - 130
			C13-123678 HexaCDD	2018/12/21		76	%	40 - 130
			C13-123678 HexaCDF	2018/12/21		66	%	40 - 130
			C13-12378 PentaCDD	2018/12/21		101	%	40 - 130
			C13-12378 PentaCDF	2018/12/21		88	%	40 - 130
			C13-123789 HexaCDF	2018/12/21		68 (1)	%	70 - 130
			C13-2378 TetraCDD	2018/12/21		102	%	40 - 130
			C13-2378 TetraCDF	2018/12/21		84	%	40 - 130
			C13-OCDD	2018/12/21		115	%	25 - 130
			2,3,7,8-Tetra CDD	2018/12/21	ND, EDL=3.2		pg	
			1,2,3,7,8-Penta CDD	2018/12/21	ND, EDL=3.0		pg	
			1,2,3,4,7,8-Hexa CDD	2018/12/21	ND, EDL=3.5		pg	
			1,2,3,6,7,8-Hexa CDD	2018/12/21	ND, EDL=3.0		pg	
			1,2,3,7,8,9-Hexa CDD	2018/12/21	ND, EDL=3.0		pg	
			1,2,3,4,6,7,8-Hepta CDD	2018/12/21	ND, EDL=3.4		pg	
			Octa CDD	2018/12/21	ND, EDL=3.4		pg	
			Total Tetra CDD	2018/12/21	ND, EDL=3.2		pg	
			Total Penta CDD	2018/12/21	ND, EDL=3.0		pg	
			Total Hexa CDD	2018/12/21	ND, EDL=3.2		pg	
			Total Hepta CDD	2018/12/21	ND, EDL=3.4		pg	
			2,3,7,8-Tetra CDF	2018/12/21	ND, EDL=2.8		pg	
			1,2,3,7,8-Penta CDF	2018/12/21	ND, EDL=3.2		pg	
			2,3,4,7,8-Penta CDF	2018/12/21	ND, EDL=3.2		pg	
			1,2,3,4,7,8-Hexa CDF	2018/12/21	ND, EDL=3.2		pg	
			1,2,3,6,7,8-Hexa CDF	2018/12/21	ND, EDL=2.9		pg	
			2,3,4,6,7,8-Hexa CDF	2018/12/21	ND, EDL=3.4		pg	
			1,2,3,7,8,9-Hexa CDF	2018/12/21	ND, EDL=3.8		pg	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,6,7,8-Hepta CDF	2018/12/21	ND, EDL=2.3		pg	
			1,2,3,4,7,8,9-Hepta CDF	2018/12/21	ND, EDL=3.3		pg	
			Octa CDF	2018/12/21	ND, EDL=3.1		pg	
			Total Tetra CDF	2018/12/21	ND, EDL=2.8		pg	
			Total Penta CDF	2018/12/21	ND, EDL=3.2		pg	
			Total Hexa CDF	2018/12/21	ND, EDL=3.3		pg	
			Total Hepta CDF	2018/12/21	ND, EDL=2.7		pg	
			Toxic Equivalency	2018/12/21	ND, EDL=2.8		pg	

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

(1) Recovery exceeds method criteria.Minimal impact on data

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

CHARTERED
Rodney A. Major
CHEMIST

Rodney Major, Manager Organic Processing Lab

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Chain of Custody Form - AIR

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CAM FCD-01302 /2

Page 7 of 11

ANALYSIS REQUESTED: USEPA TO-9 | USEPA TO-13

CLIENT INFORMATION SECTION

Company Name: RWPI
Project Manager:
e-mail:
Address:
Phone:
Fax:
Sampled by:

Field Sample ID		Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time	USEPA TO-9	USEPA TO-13
OPC-DEC04	PUF (7 SAMPLE)			12 04		✓	✓
Cove-Dec04				↓		✓	✓
Beach-Dec04				↓		✓	✓
OPC-DEC05				12/05		✓	✓
Cove-DEC05				↓		✓	✓
Beach-DEC05				↓		✓	✓
OPC-DEC06				12/06		✓	✓
Cove-Dec06				↓		✓	✓
Beach-Dec06				↓		✓	✓
OPC-Dec07				12/07		✓	✓
Cove-Dec07				↓		✓	✓
Beach-Dec07	↓			↓		✓	✓

10-Dec-18 10:21
Clayton Johnson
B8X0068
DSG AIR-FRIDGE

TAT Requirement
STD 10 Business day ☐
Rush 5 Business day * ☐
Rush 2 Business day * ☐
* need approval from Maxxam

PROJECT INFORMATION
Project #:
Name:
PO #:
Maxxam Quote #:
Maxxam Contact:

REPORTING REQUIREMENTS
Summary Report only ☐
EDD ☐
Regulation

Notes
Please note if this samples are "Industrial Hygiene" samples
If submitting dustfall samples, please indicate the diameter of the jar opening in cm.
PROJECT SPECIFIC COMMENTS

Client Signature:
Affiliation:
Date/Time:

Received by: See Page 1
Affiliation:
Date/Time:

2018/12/10 10:21. 5.8, 6.8, 8.4°C

COC-1031 (11/2017)

Chain of Custody Form - AIR

30781

Maxxam
A Bureau Veritas Group Company

6740 Campobello Rd
Mississauga Ontario, L5N 2L8
www.maxxamanalytics.com

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Phone: (905) 817-5700
Fax: (905) 817-5777

CAM FCD-01302 /2

Page 8 of 11

ANALYSIS REQUESTED

CLIENT INFORMATION SECTION

Company Name: RWPI
Project Manager:
e-mail:
Address:
Phone: Fax:
Sampled by:

Field Sample ID		Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time	USEPA M TO-9	USEPA M TO-13										
OPE DECOS	PUF (7 SAMPLES)			12/68		✓	✓										
COVE - DECOR	↓			↓		✓	✓										
BEACH - DECOR						✓	✓										
BLANK	↓			N/A		✓	✓										

TAT Requirement

STD 10 Business day ☐
Rush 5 Business day * ☐
Rush 2 Business day * ☐
* need approval from Maxxam

PROJECT INFORMATION

Project #:
Name:
PO #:
Maxxam Quote #:
Maxxam Contact:

REPORTING REQUIREMENTS

Summary Report only ☐
EDD ☐
Regulation

Notes

Please note if this samples are "Industrial Hygiene" samples

If submitting dustfall samples, please indicate the diameter of the jar opening in cm.

PROJECT SPECIFIC COMMENTS

Client Signature:
Affiliation:
Date/Time:

Received by: See Page 1
Affiliation:
Date/Time:

COC-1031 (11/2017)

Your P.O. #: 1804600
Your Project #: 1804600
Site Location: ST MARYS AMBIENT
Your C.O.C. #: na

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/11/01
Report #: R5466566
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8R1800
Received: 2018/10/15, 15:21

Sample Matrix: PUF AND FILTER
Samples Received: 10

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Dioxins/Furans in Ambient Air (TO-9)	5	2018/10/17	2018/10/26	BRL SOP-00411	EPA TO-9 m
Dioxins/Furans in Ambient Air (TO-9)	5	2018/10/17	2018/10/30	BRL SOP-00411	EPA TO-9 m
PAHs in Ambient Air Samples by HRMS	10	2018/10/17	2018/10/30	BRL SOP-00418	CARB429 m
PAH's in Air (CARB429mod)	1	2018/10/17	2018/10/23	BRL SOP-00201	CARB429/ARBM1/M2 m
PAH's in Air (CARB429mod)	9	2018/10/17	2018/10/24	BRL SOP-00201	CARB429/ARBM1/M2 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Your P.O. #: 1804600
Your Project #: 1804600
Site Location: ST MARYS AMBIENT
Your C.O.C. #: na

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/11/01
Report #: R5466566
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8R1800
Received: 2018/10/15, 15:21

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

RESULTS OF ANALYSES OF PUF AND FILTER

Maxxam ID		IAF922		IAF923				
Sampling Date		2018/10/10		2018/10/10				
COC Number		na		na				
	UNITS	**PUF-OPG-OCTOBER10 (2 SAMPLES)**	**EDL**	**PUF-COVE-OCTOBER10 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**QC Batch**
Benzo(a)pyrene	ug	0.00714	0.00078	0.00882	0.00084	0.030	N/A	5805555
Surrogate Recovery (%)								
Benzo(a)pyrene (13C4)	%	87		107				5805555

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam ID		IAF924		IAF925				
Sampling Date		2018/10/10		2018/10/11				
COC Number		na		na				
	UNITS	**PUF-BEACH-OCTOBER10 (2 SAMPLES)**	**EDL**	**PUF-OPG-OCTOBER11 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**QC Batch**
Benzo(a)pyrene	ug	0.0060	0.0011	0.00367	0.00063	0.030	N/A	5805555
Surrogate Recovery (%)								
Benzo(a)pyrene (13C4)	%	97		88				5805555

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam ID		IAF926	IAF927		IAF928				
Sampling Date		2018/10/11	2018/10/11		2018/10/12				
COC Number		na	na		na				
	UNITS	**PUF-COVE-OCTOBER11 (2 SAMPLES)**	**PUF-BEACH-OCTOBER11 (2 SAMPLES)**	**EDL**	**PUF-OPG-OCTOBER12 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**QC Batch**
Benzo(a)pyrene	ug	0.00519	0.0111	0.00074	0.00592	0.00072	0.030	N/A	5805555
Surrogate Recovery (%)									
Benzo(a)pyrene (13C4)	%	78	85		77				5805555

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

RESULTS OF ANALYSES OF PUF AND FILTER

Maxxam ID		IAF929		IAF930		IAF931				
Sampling Date		2018/10/12		2018/10/12						
COC Number		na		na		na				
	UNITS	**PUF-COVE-OCTOBER12 (2 SAMPLES)**	**EDL**	**PUF-BEACH-OCTOBER12 (2 SAMPLES)**	**EDL**	**PUF BLANK**	**EDL**	**RDL**	**MDL**	**QC Batch**
Benzo(a)pyrene	ug	0.00331	0.00065	0.00525	0.00085	ND	0.00066	0.030	N/A	5805555
Surrogate Recovery (%)										
Benzo(a)pyrene (13C4)	%	93		85		93				5805555

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

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Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

SEMI-VOLATILE ORGANICS BY GC-MS (PUF AND FILTER)

Maxxam ID		IAF922	IAF923	IAF924			
Sampling Date		2018/10/10	2018/10/10	2018/10/10			
COC Number		na	na	na			
	UNITS	**PUF-OPG-OCTOBER10 (2 SAMPLES)**	**PUF-COVE-OCTOBER10 (2 SAMPLES)**	**PUF-BEACH-OCTOBER10 (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
1-Methylnaphthalene	ug	1.71	1.14	1.11	0.15	0.030	5788412
1-Methylphenanthrene	ug	ND	0.21	0.21	0.15	0.030	5788412
2-Chloronaphthalene	ug	ND	ND	ND	0.15	0.030	5788412
2-Methylanthracene	ug	ND	ND	ND	0.15	0.030	5788412
2-Methylnaphthalene	ug	2.73	1.77	1.71	0.15	0.030	5788412
3-Methylcholanthrene	ug	ND	ND	ND	3.0	0.60	5788412
7,12-Dimethylbenzo(a)anthracene	ug	ND	ND	ND	0.60	N/A	5788412
9,10-Dimethylanthracene	ug	ND	ND	ND	0.60	0.12	5788412
Acenaphthene	ug	0.630	0.450	0.360	0.075	0.030	5788412
Acenaphthylene	ug	ND	ND	ND	0.075	0.030	5788412
Anthracene	ug	ND	ND	ND	0.075	0.030	5788412
Benzo(a)anthracene	ug	ND	ND	ND	0.075	0.030	5788412
Benzo(a)fluorene	ug	ND	ND	ND	0.15	0.030	5788412
Benzo(b)fluoranthene	ug	ND	ND	ND	0.075	0.030	5788412
Benzo(b)fluorene	ug	ND	ND	ND	0.15	0.030	5788412
Benzo(e)pyrene	ug	ND	ND	ND	0.15	0.030	5788412
Benzo(g,h,i)perylene	ug	ND	ND	ND	0.075	0.030	5788412
Benzo(k)fluoranthene	ug	ND	ND	ND	0.075	0.030	5788412
Chrysene	ug	ND	0.090	0.090	0.075	0.030	5788412
Coronene	ug	ND	ND	ND	0.15	0.030	5788412
Dibenz(a,h)anthracene	ug	ND	ND	ND	0.075	0.030	5788412
Dibenzo(a,c) anthracene + Picene	ug	ND	ND	ND	0.15	0.030	5788412
Dibenzo(a,c)anthracene	ug	ND	ND	ND	0.15	0.030	5788412
Dibenzo(a,e)pyrene	ug	ND	ND	ND	0.30	0.060	5788412
Fluoranthene	ug	0.420	0.450	0.510	0.075	0.030	5788412
Fluorene	ug	0.690	0.810	0.600	0.075	0.030	5788412
Indeno(1,2,3-cd)pyrene	ug	ND	ND	ND	0.075	0.030	5788412
Naphthalene	ug	6.54	4.80	4.68	0.11	0.031	5788412
Perylene	ug	ND	ND	ND	0.15	0.030	5788412
Phenanthrene	ug	1.56	1.89	1.86	0.075	0.030	5788412
Picene	ug	ND	ND	ND	0.15	0.030	5788412
Pyrene	ug	0.210	0.450	0.360	0.075	0.030	5788412

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

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Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

SEMI-VOLATILE ORGANICS BY GC-MS (PUF AND FILTER)

Maxxam ID		IAF922	IAF923	IAF924			
Sampling Date		2018/10/10	2018/10/10	2018/10/10			
COC Number		na	na	na			
	UNITS	**PUF-OPG-OCTOBER10 (2 SAMPLES)**	**PUF-COVE-OCTOBER10 (2 SAMPLES)**	**PUF-BEACH-OCTOBER10 (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
Tetralin	ug	1.14	0.54	0.57	0.15	0.030	5788412
Surrogate Recovery (%)							
D10-2-Methylnaphthalene	%	84	80	84			5788412
D10-Fluoranthene	%	92	88	100			5788412
D10-Fluorene (FS)	%	86	56	84			5788412
D10-Phenanthrene	%	88	86	96			5788412
D12-Benzo(a)anthracene	%	106	106	112			5788412
D12-Benzo(a)pyrene	%	98	102	98			5788412
D12-Benzo(b)fluoranthene	%	116	112	120			5788412
D12-Benzo(ghi)perylene	%	98	98	104			5788412
D12-Benzo(k)fluoranthene	%	94	96	102			5788412
D12-Chrysene	%	108	106	116			5788412
D12-Indeno(1,2,3-cd)pyrene	%	98	98	102			5788412
D12-Perylene	%	100	102	100			5788412
D14-Dibenzo(a,h)anthracene	%	98	98	102			5788412
D14-Terphenyl (FS)	%	90	90	98			5788412
D8-Acenaphthylene	%	84	82	86			5788412
D8-Naphthalene	%	78	74	76			5788412
RDL = Reportable Detection Limit QC Batch = Quality Control Batch							

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

SEMI-VOLATILE ORGANICS BY GC-MS (PUF AND FILTER)

Maxxam ID		IAF925	IAF926	IAF927			
Sampling Date		2018/10/11	2018/10/11	2018/10/11			
COC Number		na	na	na			
	UNITS	**PUF-OPG-OCTOBER11 (2 SAMPLES)**	**PUF-COVE-OCTOBER11 (2 SAMPLES)**	**PUF-BEACH-OCTOBER11 (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
1-Methylnaphthalene	ug	0.63	0.90	1.38	0.15	0.030	5788412
1-Methylphenanthrene	ug	ND	ND	ND	0.15	0.030	5788412
2-Chloronaphthalene	ug	ND	ND	ND	0.15	0.030	5788412
2-Methylanthracene	ug	ND	ND	ND	0.15	0.030	5788412
2-Methylnaphthalene	ug	1.08	1.50	2.13	0.15	0.030	5788412
3-Methylcholanthrene	ug	ND	ND	ND	3.0	0.60	5788412
7,12-Dimethylbenzo(a)anthracene	ug	ND	ND	ND	0.60	N/A	5788412
9,10-Dimethylanthracene	ug	ND	ND	ND	0.60	0.12	5788412
Acenaphthene	ug	0.330	0.270	0.300	0.075	0.030	5788412
Acenaphthylene	ug	ND	ND	ND	0.075	0.030	5788412
Anthracene	ug	ND	ND	ND	0.075	0.030	5788412
Benzo(a)anthracene	ug	ND	ND	ND	0.075	0.030	5788412
Benzo(a)fluorene	ug	ND	ND	ND	0.15	0.030	5788412
Benzo(b)fluoranthene	ug	ND	ND	ND	0.075	0.030	5788412
Benzo(b)fluorene	ug	ND	ND	ND	0.15	0.030	5788412
Benzo(e)pyrene	ug	ND	ND	ND	0.15	0.030	5788412
Benzo(g,h,i)perylene	ug	ND	ND	ND	0.075	0.030	5788412
Benzo(k)fluoranthene	ug	ND	ND	ND	0.075	0.030	5788412
Chrysene	ug	ND	0.090	ND	0.075	0.030	5788412
Coronene	ug	ND	ND	ND	0.15	0.030	5788412
Dibenz(a,h)anthracene	ug	ND	ND	ND	0.075	0.030	5788412
Dibenzo(a,c) anthracene + Picene	ug	ND	ND	ND	0.15	0.030	5788412
Dibenzo(a,c)anthracene	ug	ND	ND	ND	0.15	0.030	5788412
Dibenzo(a,e)pyrene	ug	ND	ND	ND	0.30	0.060	5788412
Fluoranthene	ug	0.120	0.270	0.180	0.075	0.030	5788412
Fluorene	ug	0.360	0.390	0.360	0.075	0.030	5788412
Indeno(1,2,3-cd)pyrene	ug	ND	ND	ND	0.075	0.030	5788412
Naphthalene	ug	3.36	3.72	4.11	0.11	0.031	5788412
Perylene	ug	ND	ND	ND	0.15	0.030	5788412
Phenanthrene	ug	0.660	1.08	0.870	0.075	0.030	5788412
Picene	ug	ND	ND	ND	0.15	0.030	5788412
Pyrene	ug	ND	0.180	0.120	0.075	0.030	5788412

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

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Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

SEMI-VOLATILE ORGANICS BY GC-MS (PUF AND FILTER)

Maxxam ID		IAF925	IAF926	IAF927			
Sampling Date		2018/10/11	2018/10/11	2018/10/11			
COC Number		na	na	na			
	UNITS	**PUF-OPG-OCTOBER11 (2 SAMPLES)**	**PUF-COVE-OCTOBER11 (2 SAMPLES)**	**PUF-BEACH-OCTOBER11 (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
Tetralin	ug	0.30	0.60	0.75	0.15	0.030	5788412
Surrogate Recovery (%)							
D10-2-Methylnaphthalene	%	90	82	88			5788412
D10-Fluoranthene	%	102	96	96			5788412
D10-Fluorene (FS)	%	88	84	90			5788412
D10-Phenanthrene	%	98	96	94			5788412
D12-Benzo(a)anthracene	%	118	112	112			5788412
D12-Benzo(a)pyrene	%	100	94	96			5788412
D12-Benzo(b)fluoranthene	%	116	110	108			5788412
D12-Benzo(ghi)perylene	%	112	106	102			5788412
D12-Benzo(k)fluoranthene	%	100	98	96			5788412
D12-Chrysene	%	120	122	116			5788412
D12-Indeno(1,2,3-cd)pyrene	%	110	106	104			5788412
D12-Perylene	%	102	104	98			5788412
D14-Dibenzo(a,h)anthracene	%	108	104	104			5788412
D14-Terphenyl (FS)	%	102	100	98			5788412
D8-Acenaphthylene	%	92	84	90			5788412
D8-Naphthalene	%	86	76	80			5788412

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

SEMI-VOLATILE ORGANICS BY GC-MS (PUF AND FILTER)

Maxxam ID		IAF928	IAF929	IAF930	IAF931			
Sampling Date		2018/10/12	2018/10/12	2018/10/12				
COC Number		na	na	na	na			
	UNITS	**PUF-OPG-OCTOBER12 (2 SAMPLES)**	**PUF-COVE-OCTOBER12 (2 SAMPLES)**	**PUF-BEACH-OCTOBER12 (2 SAMPLES)**	**PUF BLANK**	**RDL**	**MDL**	**QC Batch**
1-Methylnaphthalene	ug	0.72	0.96	0.96	ND	0.15	0.030	5788412
1-Methylphenanthrene	ug	ND	ND	ND	ND	0.15	0.030	5788412
2-Chloronaphthalene	ug	ND	ND	ND	ND	0.15	0.030	5788412
2-Methylanthracene	ug	ND	ND	ND	ND	0.15	0.030	5788412
2-Methylnaphthalene	ug	1.23	1.59	1.53	ND	0.15	0.030	5788412
3-Methylcholanthrene	ug	ND	ND	ND	ND	3.0	0.60	5788412
7,12-Dimethylbenzo(a)anthracene	ug	ND	ND	ND	ND	0.60	N/A	5788412
9,10-Dimethylanthracene	ug	ND	ND	ND	ND	0.60	0.12	5788412
Acenaphthene	ug	0.240	0.270	0.270	ND	0.075	0.030	5788412
Acenaphthylene	ug	ND	ND	ND	ND	0.075	0.030	5788412
Anthracene	ug	ND	ND	ND	ND	0.075	0.030	5788412
Benzo(a)anthracene	ug	ND	ND	ND	ND	0.075	0.030	5788412
Benzo(a)fluorene	ug	ND	ND	ND	ND	0.15	0.030	5788412
Benzo(b)fluoranthene	ug	ND	ND	ND	ND	0.075	0.030	5788412
Benzo(b)fluorene	ug	ND	ND	ND	ND	0.15	0.030	5788412
Benzo(e)pyrene	ug	ND	ND	ND	ND	0.15	0.030	5788412
Benzo(g,h,i)perylene	ug	ND	ND	ND	ND	0.075	0.030	5788412
Benzo(k)fluoranthene	ug	ND	ND	ND	ND	0.075	0.030	5788412
Chrysene	ug	ND	ND	ND	ND	0.075	0.030	5788412
Coronene	ug	ND	ND	ND	ND	0.15	0.030	5788412
Dibenz(a,h)anthracene	ug	ND	ND	ND	ND	0.075	0.030	5788412
Dibenzo(a,c) anthracene + Picene	ug	ND	ND	ND	ND	0.15	0.030	5788412
Dibenzo(a,c)anthracene	ug	ND	ND	ND	ND	0.15	0.030	5788412
Dibenzo(a,e)pyrene	ug	ND	ND	ND	ND	0.30	0.060	5788412
Fluoranthene	ug	0.120	0.090	0.090	ND	0.075	0.030	5788412
Fluorene	ug	0.210	0.240	0.240	ND	0.075	0.030	5788412
Indeno(1,2,3-cd)pyrene	ug	ND	ND	ND	ND	0.075	0.030	5788412
Naphthalene	ug	3.42	3.33	3.24	0.12	0.11	0.031	5788412
Perylene	ug	ND	ND	ND	ND	0.15	0.030	5788412
Phenanthrene	ug	0.450	0.390	0.450	ND	0.075	0.030	5788412
Picene	ug	ND	ND	ND	ND	0.15	0.030	5788412
Pyrene	ug	ND	ND	ND	ND	0.075	0.030	5788412

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

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Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

SEMI-VOLATILE ORGANICS BY GC-MS (PUF AND FILTER)

Maxxam ID		IAF928	IAF929	IAF930	IAF931			
Sampling Date		2018/10/12	2018/10/12	2018/10/12				
COC Number		na	na	na	na			
	UNITS	**PUF-OPG-OCTOBER12 (2 SAMPLES)**	**PUF-COVE-OCTOBER12 (2 SAMPLES)**	**PUF-BEACH-OCTOBER12 (2 SAMPLES)**	**PUF BLANK**	**RDL**	**MDL**	**QC Batch**
Tetralin	ug	0.36	0.72	0.57	ND	0.15	0.030	5788412
Surrogate Recovery (%)								
D10-2-Methylnaphthalene	%	94	92	88	90			5788412
D10-Fluoranthene	%	106	98	100	102			5788412
D10-Fluorene (FS)	%	98	92	92	96			5788412
D10-Phenanthrene	%	102	96	96	98			5788412
D12-Benzo(a)anthracene	%	116	122	114	118			5788412
D12-Benzo(a)pyrene	%	96	114	98	112			5788412
D12-Benzo(b)fluoranthene	%	116	132	112	130			5788412
D12-Benzo(ghi)perylene	%	114	112	106	110			5788412
D12-Benzo(k)fluoranthene	%	124	104	116	104			5788412
D12-Chrysene	%	122	124	116	118			5788412
D12-Indeno(1,2,3-cd)pyrene	%	112	110	106	112			5788412
D12-Perylene	%	104	116	104	110			5788412
D14-Dibenzo(a,h)anthracene	%	112	110	106	110			5788412
D14-Terphenyl (FS)	%	108	96	100	104			5788412
D8-Acenaphthylene	%	94	94	90	94			5788412
D8-Naphthalene	%	88	88	82	86			5788412

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		IAF922							
Sampling Date		2018/10/10							
COC Number		na				**TOXIC EQUIVALENCY**		# of	
	UNITS	**PUF-OPG-OCTOBER10 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	ND	3.7	30	6.0	1.00	3.70		5803169
1,2,3,7,8-Penta CDD *	pg	ND	3.4	30	6.0	1.00	3.40		5803169
1,2,3,4,7,8-Hexa CDD *	pg	ND	3.4	30	6.0	0.100	0.340		5803169
1,2,3,6,7,8-Hexa CDD *	pg	ND	3.5	30	6.0	0.100	0.350		5803169
1,2,3,7,8,9-Hexa CDD *	pg	ND	3.3	30	6.0	0.100	0.330		5803169
1,2,3,4,6,7,8-Hepta CDD *	pg	ND	5.2	30	9.0	0.0100	0.0520		5803169
Octa CDD *	pg	20.0	6.2	300	9.0	0.000300	0.00600		5803169
Total Tetra CDD *	pg	ND	3.7	30	N/A			0	5803169
Total Penta CDD *	pg	ND	3.4	30	N/A			0	5803169
Total Hexa CDD *	pg	ND	3.4	30	N/A			0	5803169
Total Hepta CDD *	pg	ND	6.1	30	N/A			0	5803169
2,3,7,8-Tetra CDF **	pg	ND	3.0	30	6.0	0.100	0.300		5803169
1,2,3,7,8-Penta CDF **	pg	ND	3.8	30	6.0	0.0300	0.114		5803169
2,3,4,7,8-Penta CDF **	pg	ND	3.9	30	6.0	0.300	1.17		5803169
1,2,3,4,7,8-Hexa CDF **	pg	ND	2.8	30	6.0	0.100	0.280		5803169
1,2,3,6,7,8-Hexa CDF **	pg	ND	2.8	30	6.0	0.100	0.280		5803169
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.0	30	6.0	0.100	0.300		5803169
1,2,3,7,8,9-Hexa CDF **	pg	ND	3.4	30	6.0	0.100	0.340		5803169
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	2.9	30	9.0	0.0100	0.0290		5803169
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	3.9	30	6.0	0.0100	0.0390		5803169
Octa CDF **	pg	ND	6.9	300	15	0.000300	0.00207		5803169
Total Tetra CDF **	pg	ND	3.0	30	N/A			0	5803169
Total Penta CDF **	pg	ND	3.9	30	N/A			0	5803169
Total Hexa CDF **	pg	ND	3.0	30	N/A			0	5803169
Total Hepta CDF **	pg	ND	3.3	30	N/A			0	5803169

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

ND = Not detected

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		IAF922							
Sampling Date		2018/10/10							
COC Number		na				**TOXIC EQUIVALENCY**		# of	
	UNITS	**PUF-OPG-OCTOBER10 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Toxic Equivalency	pg	ND	3.0	N/A	N/A				5803169
TOTAL TOXIC EQUIVALENCY	pg						11.0		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	77							5803169
C13-1234678 HeptaCDF **	%	70							5803169
C13-123478 HexaCDD *	%	106							5803169
C13-123478 HexaCDF **	%	101							5803169
C13-1234789 HeptaCDF **	%	98							5803169
C13-123678 HexaCDD *	%	94							5803169
C13-123678 HexaCDF **	%	86							5803169
C13-12378 PentaCDD *	%	74							5803169
C13-12378 PentaCDF **	%	55							5803169
C13-123789 HexaCDF **	%	71							5803169
C13-23478 PentaCDF **	%	145 (1)							5803169
C13-2378 TetraCDD *	%	78							5803169
C13-2378 TetraCDF **	%	66							5803169
C13-OCDD *	%	64							5803169
Cl37-2378 TetraCDD *	%	92							5803169

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

ND = Not detected

N/A = Not Applicable

* CDD = Chloro Dibenzo-p-Dioxin

** CDF = Chloro Dibenzo-p-Furan

(1) Field Spike recovery outside method acceptance criteria.
Minimal impact on data

Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		IAF923							
Sampling Date		2018/10/10							
COC Number		na				**TOXIC EQUIVALENCY**		# of	
	UNITS	**PUF-COVE-OCTOBER10 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	ND	3.4	30	6.0	1.00	3.40		5803169
1,2,3,7,8-Penta CDD *	pg	ND	3.6	30	6.0	1.00	3.60		5803169
1,2,3,4,7,8-Hexa CDD *	pg	ND	3.3	30	6.0	0.100	0.330		5803169
1,2,3,6,7,8-Hexa CDD *	pg	ND	3.4	30	6.0	0.100	0.340		5803169
1,2,3,7,8,9-Hexa CDD *	pg	ND	3.2	30	6.0	0.100	0.320		5803169
1,2,3,4,6,7,8-Hepta CDD *	pg	5.6	3.8	30	9.0	0.0100	0.0560		5803169
Octa CDD *	pg	19.1	7.6	300	9.0	0.000300	0.00573		5803169
Total Tetra CDD *	pg	ND	3.4	30	N/A			0	5803169
Total Penta CDD *	pg	ND	3.6	30	N/A			0	5803169
Total Hexa CDD *	pg	ND	3.3	30	N/A			0	5803169
Total Hepta CDD *	pg	10.3	3.8	30	N/A			2	5803169
2,3,7,8-Tetra CDF **	pg	ND	3.5	30	6.0	0.100	0.350		5803169
1,2,3,7,8-Penta CDF **	pg	ND	3.3	30	6.0	0.0300	0.0990		5803169
2,3,4,7,8-Penta CDF **	pg	ND	3.3	30	6.0	0.300	0.990		5803169
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.0	30	6.0	0.100	0.300		5803169
1,2,3,6,7,8-Hexa CDF **	pg	ND	3.1	30	6.0	0.100	0.310		5803169
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.3	30	6.0	0.100	0.330		5803169
1,2,3,7,8,9-Hexa CDF **	pg	ND	3.7	30	6.0	0.100	0.370		5803169
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	3.1	30	9.0	0.0100	0.0310		5803169
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	4.1	30	6.0	0.0100	0.0410		5803169
Octa CDF **	pg	ND	6.2	300	15	0.000300	0.00186		5803169
Total Tetra CDF **	pg	ND	3.5	30	N/A			0	5803169
Total Penta CDF **	pg	ND	3.3	30	N/A			0	5803169
Total Hexa CDF **	pg	ND	3.3	30	N/A			0	5803169
Total Hepta CDF **	pg	ND	3.5	30	N/A			0	5803169

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		IAF923							
Sampling Date		2018/10/10							
COC Number		na				**TOXIC EQUIVALENCY**		# of	
	UNITS	**PUF-COVE-OCTOBER10 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Toxic Equivalency	pg	ND	3.5	N/A	N/A				5803169
TOTAL TOXIC EQUIVALENCY	pg						10.9		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	83							5803169
C13-1234678 HeptaCDF **	%	74							5803169
C13-123478 HexaCDD *	%	106							5803169
C13-123478 HexaCDF **	%	107							5803169
C13-1234789 HeptaCDF **	%	97							5803169
C13-123678 HexaCDD *	%	95							5803169
C13-123678 HexaCDF **	%	85							5803169
C13-12378 PentaCDD *	%	68							5803169
C13-12378 PentaCDF **	%	53							5803169
C13-123789 HexaCDF **	%	76							5803169
C13-23478 PentaCDF **	%	137 (1)							5803169
C13-2378 TetraCDD *	%	67							5803169
C13-2378 TetraCDF **	%	57							5803169
C13-OCDD *	%	71							5803169
Cl37-2378 TetraCDD *	%	96							5803169

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

ND = Not detected

N/A = Not Applicable

* CDD = Chloro Dibenzo-p-Dioxin

** CDF = Chloro Dibenzo-p-Furan

(1) Field Spike recovery outside method acceptance criteria.
Minimal impact on data

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Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		IAF924							
Sampling Date		2018/10/10							
COC Number		na				**TOXIC EQUIVALENCY**		# of	
	UNITS	**PUF-BEACH-OCTOBER10 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	ND	3.2	30	6.0	1.00	3.20		5803169
1,2,3,7,8-Penta CDD *	pg	ND	3.0	30	6.0	1.00	3.00		5803169
1,2,3,4,7,8-Hexa CDD *	pg	ND	3.2	30	6.0	0.100	0.320		5803169
1,2,3,6,7,8-Hexa CDD *	pg	ND	3.2	30	6.0	0.100	0.320		5803169
1,2,3,7,8,9-Hexa CDD *	pg	ND	3.1	30	6.0	0.100	0.310		5803169
1,2,3,4,6,7,8-Hepta CDD *	pg	5.6	3.0	30	9.0	0.0100	0.0560		5803169
Octa CDD *	pg	22.0	2.7	300	9.0	0.000300	0.00660		5803169
Total Tetra CDD *	pg	ND	3.2	30	N/A			0	5803169
Total Penta CDD *	pg	ND	3.0	30	N/A			0	5803169
Total Hexa CDD *	pg	ND	3.2	30	N/A			0	5803169
Total Hepta CDD *	pg	11.1	3.0	30	N/A			2	5803169
2,3,7,8-Tetra CDF **	pg	ND	3.1	30	6.0	0.100	0.310		5803169
1,2,3,7,8-Penta CDF **	pg	ND	3.0	30	6.0	0.0300	0.0900		5803169
2,3,4,7,8-Penta CDF **	pg	ND	3.1	30	6.0	0.300	0.930		5803169
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.0	30	6.0	0.100	0.300		5803169
1,2,3,6,7,8-Hexa CDF **	pg	ND	2.9	30	6.0	0.100	0.290		5803169
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.4	30	6.0	0.100	0.340		5803169
1,2,3,7,8,9-Hexa CDF **	pg	ND	3.9	30	6.0	0.100	0.390		5803169
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	2.2	30	9.0	0.0100	0.0220		5803169
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	3.2	30	6.0	0.0100	0.0320		5803169
Octa CDF **	pg	ND	3.3	300	15	0.000300	0.000990		5803169
Total Tetra CDF **	pg	ND	3.1	30	N/A			0	5803169
Total Penta CDF **	pg	ND	3.1	30	N/A			0	5803169
Total Hexa CDF **	pg	ND	3.3	30	N/A			0	5803169
Total Hepta CDF **	pg	ND	2.6	30	N/A			0	5803169

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

ND = Not detected

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		IAF924							
Sampling Date		2018/10/10							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	PUF-BEACH-OCTOBER10 (2 SAMPLES)	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
Toxic Equivalency	pg	ND	3.1	N/A	N/A				5803169
TOTAL TOXIC EQUIVALENCY	pg						9.92		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	100							5803169
C13-1234678 HeptaCDF **	%	95							5803169
C13-123478 HexaCDD *	%	111							5803169
C13-123478 HexaCDF **	%	96							5803169
C13-1234789 HeptaCDF **	%	101							5803169
C13-123678 HexaCDD *	%	94							5803169
C13-123678 HexaCDF **	%	68							5803169
C13-12378 PentaCDD *	%	85							5803169
C13-12378 PentaCDF **	%	78							5803169
C13-123789 HexaCDF **	%	75							5803169
C13-23478 PentaCDF **	%	103							5803169
C13-2378 TetraCDD *	%	81							5803169
C13-2378 TetraCDF **	%	64							5803169
C13-OCDD *	%	116							5803169
Cl37-2378 TetraCDD *	%	84							5803169

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		IAF925							
Sampling Date		2018/10/11							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	PUF-OPG-OCTOBER11 (2 SAMPLES)	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	ND	2.5	30	6.0	1.00	2.50		5803169
1,2,3,7,8-Penta CDD *	pg	ND	3.2	30	6.0	1.00	3.20		5803169
1,2,3,4,7,8-Hexa CDD *	pg	ND	3.3	30	6.0	0.100	0.330		5803169
1,2,3,6,7,8-Hexa CDD *	pg	ND	3.3	30	6.0	0.100	0.330		5803169
1,2,3,7,8,9-Hexa CDD *	pg	ND	3.2	30	6.0	0.100	0.320		5803169
1,2,3,4,6,7,8-Hepta CDD *	pg	3.4	3.0	30	9.0	0.0100	0.0340		5803169
Octa CDD *	pg	18.2	3.0	300	9.0	0.000300	0.00546		5803169
Total Tetra CDD *	pg	ND	2.5	30	N/A			0	5803169
Total Penta CDD *	pg	ND	3.2	30	N/A			0	5803169
Total Hexa CDD *	pg	ND	3.3	30	N/A			0	5803169
Total Hepta CDD *	pg	7.0	3.0	30	N/A			2	5803169
2,3,7,8-Tetra CDF **	pg	ND	3.1	30	6.0	0.100	0.310		5803169
1,2,3,7,8-Penta CDF **	pg	ND	3.1	30	6.0	0.0300	0.0930		5803169
2,3,4,7,8-Penta CDF **	pg	ND	3.2	30	6.0	0.300	0.960		5803169
1,2,3,4,7,8-Hexa CDF **	pg	ND	2.8	30	6.0	0.100	0.280		5803169
1,2,3,6,7,8-Hexa CDF **	pg	ND	2.8	30	6.0	0.100	0.280		5803169
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.2	30	6.0	0.100	0.320		5803169
1,2,3,7,8,9-Hexa CDF **	pg	ND	3.7	30	6.0	0.100	0.370		5803169
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	1.9	30	9.0	0.0100	0.0190		5803169
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	2.8	30	6.0	0.0100	0.0280		5803169
Octa CDF **	pg	ND	2.7	300	15	0.000300	0.000810		5803169
Total Tetra CDF **	pg	ND	3.1	30	N/A			0	5803169
Total Penta CDF **	pg	ND	3.2	30	N/A			0	5803169
Total Hexa CDF **	pg	ND	3.1	30	N/A			0	5803169
Total Hepta CDF **	pg	ND	2.3	30	N/A			0	5803169

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

ND = Not detected

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		IAF925							
Sampling Date		2018/10/11							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	**PUF-OPG-OCTOBER11 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Toxic Equivalency	pg	ND	3.1	N/A	N/A				5803169
TOTAL TOXIC EQUIVALENCY	pg						9.38		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	111							5803169
C13-1234678 HeptaCDF **	%	103							5803169
C13-123478 HexaCDD *	%	117							5803169
C13-123478 HexaCDF **	%	103							5803169
C13-1234789 HeptaCDF **	%	106							5803169
C13-123678 HexaCDD *	%	90							5803169
C13-123678 HexaCDF **	%	89							5803169
C13-12378 PentaCDD *	%	81							5803169
C13-12378 PentaCDF **	%	72							5803169
C13-123789 HexaCDF **	%	72							5803169
C13-23478 PentaCDF **	%	121							5803169
C13-2378 TetraCDD *	%	78							5803169
C13-2378 TetraCDF **	%	60							5803169
C13-OCDD *	%	122							5803169
Cl37-2378 TetraCDD *	%	84							5803169

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

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Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		IAF926							
Sampling Date		2018/10/11							
COC Number		na				**TOXIC EQUIVALENCY**		# of	
	UNITS	**PUF-COVE-OCTOBER11 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	ND	3.0	30	6.0	1.00	3.00		5803169
1,2,3,7,8-Penta CDD *	pg	ND	3.0	30	6.0	1.00	3.00		5803169
1,2,3,4,7,8-Hexa CDD *	pg	ND	2.8	30	6.0	0.100	0.280		5803169
1,2,3,6,7,8-Hexa CDD *	pg	ND	2.8	30	6.0	0.100	0.280		5803169
1,2,3,7,8,9-Hexa CDD *	pg	ND	2.7	30	6.0	0.100	0.270		5803169
1,2,3,4,6,7,8-Hepta CDD *	pg	3.8	2.8	30	9.0	0.0100	0.0380		5803169
Octa CDD *	pg	15.8	3.1	300	9.0	0.000300	0.00474		5803169
Total Tetra CDD *	pg	ND	3.0	30	N/A			0	5803169
Total Penta CDD *	pg	ND	3.0	30	N/A			0	5803169
Total Hexa CDD *	pg	ND	2.8	30	N/A			0	5803169
Total Hepta CDD *	pg	7.5	2.8	30	N/A			2	5803169
2,3,7,8-Tetra CDF **	pg	ND	2.9	30	6.0	0.100	0.290		5803169
1,2,3,7,8-Penta CDF **	pg	ND	3.0	30	6.0	0.0300	0.0900		5803169
2,3,4,7,8-Penta CDF **	pg	ND	3.0	30	6.0	0.300	0.900		5803169
1,2,3,4,7,8-Hexa CDF **	pg	ND	2.9	30	6.0	0.100	0.290		5803169
1,2,3,6,7,8-Hexa CDF **	pg	ND	2.8	30	6.0	0.100	0.280		5803169
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.2	30	6.0	0.100	0.320		5803169
1,2,3,7,8,9-Hexa CDF **	pg	ND	3.7	30	6.0	0.100	0.370		5803169
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	2.4	30	9.0	0.0100	0.0240		5803169
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	3.5	30	6.0	0.0100	0.0350		5803169
Octa CDF **	pg	ND	3.1	300	15	0.000300	0.000930		5803169
Total Tetra CDF **	pg	ND	2.9	30	N/A			0	5803169
Total Penta CDF **	pg	ND	3.0	30	N/A			0	5803169
Total Hexa CDF **	pg	ND	3.1	30	N/A			0	5803169
Total Hepta CDF **	pg	ND	2.8	30	N/A			0	5803169

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

ND = Not detected

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		IAF926							
Sampling Date		2018/10/11							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	**PUF-COVE-OCTOBER11 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Toxic Equivalency	pg	ND	2.9	N/A	N/A				5803169
TOTAL TOXIC EQUIVALENCY	pg						9.47		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	115							5803169
C13-1234678 HeptaCDF **	%	103							5803169
C13-123478 HexaCDD *	%	119							5803169
C13-123478 HexaCDF **	%	100							5803169
C13-1234789 HeptaCDF **	%	115							5803169
C13-123678 HexaCDD *	%	93							5803169
C13-123678 HexaCDF **	%	86							5803169
C13-12378 PentaCDD *	%	80							5803169
C13-12378 PentaCDF **	%	72							5803169
C13-123789 HexaCDF **	%	80							5803169
C13-23478 PentaCDF **	%	122							5803169
C13-2378 TetraCDD *	%	83							5803169
C13-2378 TetraCDF **	%	63							5803169
C13-OCDD *	%	125							5803169
Cl37-2378 TetraCDD *	%	89							5803169

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		IAF927							
Sampling Date		2018/10/11							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	PUF-BEACH-OCTOBER11 (2 SAMPLES)	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	ND	2.9	30	6.0	1.00	2.90		5803169
1,2,3,7,8-Penta CDD *	pg	ND	3.6	30	6.0	1.00	3.60		5803169
1,2,3,4,7,8-Hexa CDD *	pg	ND	3.1	30	6.0	0.100	0.310		5803169
1,2,3,6,7,8-Hexa CDD *	pg	ND	3.0	30	6.0	0.100	0.300		5803169
1,2,3,7,8,9-Hexa CDD *	pg	ND	3.0	30	6.0	0.100	0.300		5803169
1,2,3,4,6,7,8-Hepta CDD *	pg	3.8	3.1	30	9.0	0.0100	0.0380		5803169
Octa CDD *	pg	13.6	2.4	300	9.0	0.000300	0.00408		5803169
Total Tetra CDD *	pg	ND	2.9	30	N/A			0	5803169
Total Penta CDD *	pg	ND	3.6	30	N/A			0	5803169
Total Hexa CDD *	pg	ND	3.0	30	N/A			0	5803169
Total Hepta CDD *	pg	7.3	3.1	30	N/A			2	5803169
2,3,7,8-Tetra CDF **	pg	ND	2.9	30	6.0	0.100	0.290		5803169
1,2,3,7,8-Penta CDF **	pg	ND	3.1	30	6.0	0.0300	0.0930		5803169
2,3,4,7,8-Penta CDF **	pg	ND	3.2	30	6.0	0.300	0.960		5803169
1,2,3,4,7,8-Hexa CDF **	pg	ND	2.3	30	6.0	0.100	0.230		5803169
1,2,3,6,7,8-Hexa CDF **	pg	ND	2.2	30	6.0	0.100	0.220		5803169
2,3,4,6,7,8-Hexa CDF **	pg	ND	2.6	30	6.0	0.100	0.260		5803169
1,2,3,7,8,9-Hexa CDF **	pg	ND	2.9	30	6.0	0.100	0.290		5803169
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	2.7	30	9.0	0.0100	0.0270		5803169
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	3.9	30	6.0	0.0100	0.0390		5803169
Octa CDF **	pg	ND	3.0	300	15	0.000300	0.000900		5803169
Total Tetra CDF **	pg	ND	2.9	30	N/A			0	5803169
Total Penta CDF **	pg	ND	3.2	30	N/A			0	5803169
Total Hexa CDF **	pg	ND	2.5	30	N/A			0	5803169
Total Hepta CDF **	pg	ND	3.2	30	N/A			0	5803169

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		IAF927							
Sampling Date		2018/10/11							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	PUF-BEACH-OCTOBER11 (2 SAMPLES)	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
Toxic Equivalency	pg	ND	2.9	N/A	N/A				5803169
TOTAL TOXIC EQUIVALENCY	pg						9.86		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	101							5803169
C13-1234678 HeptaCDF **	%	89							5803169
C13-123478 HexaCDD *	%	124							5803169
C13-123478 HexaCDF **	%	104							5803169
C13-1234789 HeptaCDF **	%	116							5803169
C13-123678 HexaCDD *	%	79							5803169
C13-123678 HexaCDF **	%	76							5803169
C13-12378 PentaCDD *	%	66							5803169
C13-12378 PentaCDF **	%	63							5803169
C13-123789 HexaCDF **	%	76							5803169
C13-23478 PentaCDF **	%	117							5803169
C13-2378 TetraCDD *	%	88							5803169
C13-2378 TetraCDF **	%	67							5803169
C13-OCDD *	%	107							5803169
Cl37-2378 TetraCDD *	%	86							5803169

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		IAF928							
Sampling Date		2018/10/12							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	PUF-OPG-OCTOBER12 (2 SAMPLES)	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	ND	2.5	30	6.0	1.00	2.50		5803169
1,2,3,7,8-Penta CDD *	pg	ND	2.7	30	6.0	1.00	2.70		5803169
1,2,3,4,7,8-Hexa CDD *	pg	ND	3.2	30	6.0	0.100	0.320		5803169
1,2,3,6,7,8-Hexa CDD *	pg	ND	3.1	30	6.0	0.100	0.310		5803169
1,2,3,7,8,9-Hexa CDD *	pg	ND	3.1	30	6.0	0.100	0.310		5803169
1,2,3,4,6,7,8-Hepta CDD *	pg	15.5	2.6	30	9.0	0.0100	0.155		5803169
Octa CDD *	pg	44.4	3.2	300	9.0	0.000300	0.0133		5803169
Total Tetra CDD *	pg	ND	2.5	30	N/A			0	5803169
Total Penta CDD *	pg	ND	2.7	30	N/A			0	5803169
Total Hexa CDD *	pg	ND (1)	4.1	30	N/A			0	5803169
Total Hepta CDD *	pg	29.3	2.6	30	N/A			2	5803169
2,3,7,8-Tetra CDF **	pg	ND	2.7	30	6.0	0.100	0.270		5803169
1,2,3,7,8-Penta CDF **	pg	ND	2.8	30	6.0	0.0300	0.0840		5803169
2,3,4,7,8-Penta CDF **	pg	ND	2.8	30	6.0	0.300	0.840		5803169
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.0	30	6.0	0.100	0.300		5803169
1,2,3,6,7,8-Hexa CDF **	pg	ND	3.0	30	6.0	0.100	0.300		5803169
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.4	30	6.0	0.100	0.340		5803169
1,2,3,7,8,9-Hexa CDF **	pg	ND	3.9	30	6.0	0.100	0.390		5803169
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	2.7	30	9.0	0.0100	0.0270		5803169
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	3.8	30	6.0	0.0100	0.0380		5803169
Octa CDF **	pg	ND	3.2	300	15	0.000300	0.000960		5803169
Total Tetra CDF **	pg	ND	2.7	30	N/A			0	5803169
Total Penta CDF **	pg	ND	2.8	30	N/A			0	5803169
Total Hexa CDF **	pg	ND	3.3	30	N/A			0	5803169

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		IAF928							
Sampling Date		2018/10/12							
COC Number		na				**TOXIC EQUIVALENCY**		# of	
	UNITS	**PUF-OPG-OCTOBER12 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Total Hepta CDF **	pg	ND	3.1	30	N/A			0	5803169
Toxic Equivalency	pg	ND	2.7	N/A	N/A				5803169
TOTAL TOXIC EQUIVALENCY	pg						8.90		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	107							5803169
C13-1234678 HeptaCDF **	%	95							5803169
C13-123478 HexaCDD *	%	108							5803169
C13-123478 HexaCDF **	%	102							5803169
C13-1234789 HeptaCDF **	%	113							5803169
C13-123678 HexaCDD *	%	94							5803169
C13-123678 HexaCDF **	%	81							5803169
C13-12378 PentaCDD *	%	75							5803169
C13-12378 PentaCDF **	%	63							5803169
C13-123789 HexaCDF **	%	76							5803169
C13-23478 PentaCDF **	%	126							5803169
C13-2378 TetraCDD *	%	75							5803169
C13-2378 TetraCDF **	%	59							5803169
C13-OCDD *	%	114							5803169
Cl37-2378 TetraCDD *	%	87							5803169

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

** CDF = Chloro Dibenzo-p-Furan

ND = Not detected

N/A = Not Applicable

* CDD = Chloro Dibenzo-p-Dioxin

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Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		IAF929							
Sampling Date		2018/10/12							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	PUF-COVE-OCTOBER12 (2 SAMPLES)	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	ND	3.2	30	6.0	1.00	3.20		5803169
1,2,3,7,8-Penta CDD *	pg	ND	3.2	30	6.0	1.00	3.20		5803169
1,2,3,4,7,8-Hexa CDD *	pg	ND	3.5	30	6.0	0.100	0.350		5803169
1,2,3,6,7,8-Hexa CDD *	pg	ND	3.4	30	6.0	0.100	0.340		5803169
1,2,3,7,8,9-Hexa CDD *	pg	ND	3.4	30	6.0	0.100	0.340		5803169
1,2,3,4,6,7,8-Hepta CDD *	pg	10.6	3.4	30	9.0	0.0100	0.106		5803169
Octa CDD *	pg	27.3	6.0	300	9.0	0.000300	0.00819		5803169
Total Tetra CDD *	pg	ND	3.2	30	N/A			0	5803169
Total Penta CDD *	pg	ND	3.2	30	N/A			0	5803169
Total Hexa CDD *	pg	ND (1)	9.2	30	N/A			0	5803169
Total Hepta CDD *	pg	10.6	3.4	30	N/A			1	5803169
2,3,7,8-Tetra CDF **	pg	ND	3.4	30	6.0	0.100	0.340		5803169
1,2,3,7,8-Penta CDF **	pg	ND	3.4	30	6.0	0.0300	0.102		5803169
2,3,4,7,8-Penta CDF **	pg	ND	3.5	30	6.0	0.300	1.05		5803169
1,2,3,4,7,8-Hexa CDF **	pg	ND	2.8	30	6.0	0.100	0.280		5803169
1,2,3,6,7,8-Hexa CDF **	pg	ND	2.7	30	6.0	0.100	0.270		5803169
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.2	30	6.0	0.100	0.320		5803169
1,2,3,7,8,9-Hexa CDF **	pg	ND	3.6	30	6.0	0.100	0.360		5803169
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	2.7	30	9.0	0.0100	0.0270		5803169
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	3.9	30	6.0	0.0100	0.0390		5803169
Octa CDF **	pg	ND	6.2	300	15	0.000300	0.00186		5803169
Total Tetra CDF **	pg	ND	3.4	30	N/A			0	5803169
Total Penta CDF **	pg	ND	3.5	30	N/A			0	5803169
Total Hexa CDF **	pg	ND	3.0	30	N/A			0	5803169

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		IAF929							
Sampling Date		2018/10/12							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	**PUF-COVE-OCTOBER12 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Total Hepta CDF **	pg	ND	3.2	30	N/A			0	5803169
Toxic Equivalency	pg	ND	3.4	N/A	N/A				5803169
TOTAL TOXIC EQUIVALENCY	pg						10.3		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	103							5803169
C13-1234678 HeptaCDF **	%	99							5803169
C13-123478 HexaCDD *	%	120							5803169
C13-123478 HexaCDF **	%	108							5803169
C13-1234789 HeptaCDF **	%	106							5803169
C13-123678 HexaCDD *	%	89							5803169
C13-123678 HexaCDF **	%	88							5803169
C13-12378 PentaCDD *	%	96							5803169
C13-12378 PentaCDF **	%	85							5803169
C13-123789 HexaCDF **	%	73							5803169
C13-23478 PentaCDF **	%	123							5803169
C13-2378 TetraCDD *	%	94							5803169
C13-2378 TetraCDF **	%	72							5803169
C13-OCDD *	%	97							5803169
Cl37-2378 TetraCDD *	%	86							5803169

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
** CDF = Chloro Dibenzo-p-Furan
ND = Not detected
N/A = Not Applicable
* CDD = Chloro Dibenzo-p-Dioxin

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Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		IAF930							
Sampling Date		2018/10/12							
COC Number		na				**TOXIC EQUIVALENCY**		# of	
	UNITS	**PUF-BEACH-OCTOBER12 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	ND	3.1	30	6.0	1.00	3.10		5803169
1,2,3,7,8-Penta CDD *	pg	ND	3.1	30	6.0	1.00	3.10		5803169
1,2,3,4,7,8-Hexa CDD *	pg	ND	3.4	30	6.0	0.100	0.340		5803169
1,2,3,6,7,8-Hexa CDD *	pg	ND	3.4	30	6.0	0.100	0.340		5803169
1,2,3,7,8,9-Hexa CDD *	pg	ND	3.3	30	6.0	0.100	0.330		5803169
1,2,3,4,6,7,8-Hepta CDD *	pg	19.0	3.4	30	9.0	0.0100	0.190		5803169
Octa CDD *	pg	47.0	6.1	300	9.0	0.000300	0.0141		5803169
Total Tetra CDD *	pg	ND	3.1	30	N/A			0	5803169
Total Penta CDD *	pg	ND	3.1	30	N/A			0	5803169
Total Hexa CDD *	pg	9.5	3.4	30	N/A			2	5803169
Total Hepta CDD *	pg	38.1	3.4	30	N/A			2	5803169
2,3,7,8-Tetra CDF **	pg	ND	3.0	30	6.0	0.100	0.300		5803169
1,2,3,7,8-Penta CDF **	pg	ND	3.0	30	6.0	0.0300	0.0900		5803169
2,3,4,7,8-Penta CDF **	pg	ND	3.1	30	6.0	0.300	0.930		5803169
1,2,3,4,7,8-Hexa CDF **	pg	ND	2.9	30	6.0	0.100	0.290		5803169
1,2,3,6,7,8-Hexa CDF **	pg	ND	2.8	30	6.0	0.100	0.280		5803169
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.2	30	6.0	0.100	0.320		5803169
1,2,3,7,8,9-Hexa CDF **	pg	ND	3.7	30	6.0	0.100	0.370		5803169
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	2.9	30	9.0	0.0100	0.0290		5803169
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	4.2	30	6.0	0.0100	0.0420		5803169
Octa CDF **	pg	ND	6.3	300	15	0.000300	0.00189		5803169
Total Tetra CDF **	pg	ND	3.0	30	N/A			0	5803169
Total Penta CDF **	pg	ND	3.1	30	N/A			0	5803169
Total Hexa CDF **	pg	ND	3.1	30	N/A			0	5803169
Total Hepta CDF **	pg	ND	3.4	30	N/A			0	5803169

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

ND = Not detected

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		IAF930							
Sampling Date		2018/10/12							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	PUF-BEACH-OCTOBER12 (2 SAMPLES)	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
Toxic Equivalency	pg	ND	3.0	N/A	N/A				5803169
TOTAL TOXIC EQUIVALENCY	pg						10.1		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	111							5803169
C13-1234678 HeptaCDF **	%	101							5803169
C13-123478 HexaCDD *	%	125							5803169
C13-123478 HexaCDF **	%	102							5803169
C13-1234789 HeptaCDF **	%	111							5803169
C13-123678 HexaCDD *	%	93							5803169
C13-123678 HexaCDF **	%	92							5803169
C13-12378 PentaCDD *	%	120							5803169
C13-12378 PentaCDF **	%	105							5803169
C13-123789 HexaCDF **	%	78							5803169
C13-23478 PentaCDF **	%	121							5803169
C13-2378 TetraCDD *	%	105							5803169
C13-2378 TetraCDF **	%	76							5803169
C13-OCDD *	%	112							5803169
Cl37-2378 TetraCDD *	%	87							5803169

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

ND = Not detected

N/A = Not Applicable

* CDD = Chloro Dibenzo-p-Dioxin

** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		IAF931							
Sampling Date									
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	PUF BLANK	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	ND	3.5	30	6.0	1.00	3.50		5803169
1,2,3,7,8-Penta CDD *	pg	ND	3.1	30	6.0	1.00	3.10		5803169
1,2,3,4,7,8-Hexa CDD *	pg	ND	3.4	30	6.0	0.100	0.340		5803169
1,2,3,6,7,8-Hexa CDD *	pg	ND	3.3	30	6.0	0.100	0.330		5803169
1,2,3,7,8,9-Hexa CDD *	pg	ND	3.3	30	6.0	0.100	0.330		5803169
1,2,3,4,6,7,8-Hepta CDD *	pg	ND	3.1	30	9.0	0.0100	0.0310		5803169
Octa CDD *	pg	ND	6.4	300	9.0	0.000300	0.00192		5803169
Total Tetra CDD *	pg	ND	3.5	30	N/A			0	5803169
Total Penta CDD *	pg	ND	3.1	30	N/A			0	5803169
Total Hexa CDD *	pg	ND	3.3	30	N/A			0	5803169
Total Hepta CDD *	pg	ND	3.1	30	N/A			0	5803169
2,3,7,8-Tetra CDF **	pg	ND	3.3	30	6.0	0.100	0.330		5803169
1,2,3,7,8-Penta CDF **	pg	ND	3.2	30	6.0	0.0300	0.0960		5803169
2,3,4,7,8-Penta CDF **	pg	ND	3.3	30	6.0	0.300	0.990		5803169
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.2	30	6.0	0.100	0.320		5803169
1,2,3,6,7,8-Hexa CDF **	pg	ND	3.1	30	6.0	0.100	0.310		5803169
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.6	30	6.0	0.100	0.360		5803169
1,2,3,7,8,9-Hexa CDF **	pg	ND	4.2	30	6.0	0.100	0.420		5803169
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	1.5	30	9.0	0.0100	0.0150		5803169
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	2.1	30	6.0	0.0100	0.0210		5803169
Octa CDF **	pg	ND	6.0	300	15	0.000300	0.00180		5803169
Total Tetra CDF **	pg	ND	3.3	30	N/A			0	5803169
Total Penta CDF **	pg	ND	3.3	30	N/A			0	5803169
Total Hexa CDF **	pg	ND	3.5	30	N/A			0	5803169
Total Hepta CDF **	pg	ND	1.7	30	N/A			0	5803169

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

ND = Not detected

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		IAF931							
Sampling Date									
COC Number		na				**TOXIC EQUIVALENCY**		# of	
	UNITS	**PUF BLANK**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Toxic Equivalency	pg	ND	3.3	N/A	N/A				5803169
TOTAL TOXIC EQUIVALENCY	pg						10.5		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	101							5803169
C13-1234678 HeptaCDF **	%	91							5803169
C13-123478 HexaCDD *	%	124							5803169
C13-123478 HexaCDF **	%	107							5803169
C13-1234789 HeptaCDF **	%	111							5803169
C13-123678 HexaCDD *	%	85							5803169
C13-123678 HexaCDF **	%	88							5803169
C13-12378 PentaCDD *	%	98							5803169
C13-12378 PentaCDF **	%	90							5803169
C13-123789 HexaCDF **	%	75							5803169
C13-23478 PentaCDF **	%	117							5803169
C13-2378 TetraCDD *	%	115							5803169
C13-2378 TetraCDF **	%	89							5803169
C13-OCDD *	%	94							5803169
Cl37-2378 TetraCDD *	%	87							5803169

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

TEST SUMMARY

Maxxam ID: IAF922
Sample ID: PUF-OPG-OCTOBER10 (2 SAMPLES)
Matrix: PUF AND FILTER

Collected: 2018/10/10
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5803169	2018/10/17	2018/10/26	Cathy Xu
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5805555	2018/10/17	2018/10/30	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5788412	2018/10/17	2018/10/24	Fan (Carrie) Jiang

Maxxam ID: IAF923
Sample ID: PUF-COVE-OCTOBER10 (2 SAMPLES)
Matrix: PUF AND FILTER

Collected: 2018/10/10
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5803169	2018/10/17	2018/10/26	Cathy Xu
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5805555	2018/10/17	2018/10/30	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5788412	2018/10/17	2018/10/24	Fan (Carrie) Jiang

Maxxam ID: IAF924
Sample ID: PUF-BEACH-OCTOBER10 (2 SAMPLES)
Matrix: PUF AND FILTER

Collected: 2018/10/10
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5803169	2018/10/17	2018/10/30	Cathy Xu
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5805555	2018/10/17	2018/10/30	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5788412	2018/10/17	2018/10/24	Fan (Carrie) Jiang

Maxxam ID: IAF925
Sample ID: PUF-OPG-OCTOBER11 (2 SAMPLES)
Matrix: PUF AND FILTER

Collected: 2018/10/11
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5803169	2018/10/17	2018/10/30	Cathy Xu
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5805555	2018/10/17	2018/10/30	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5788412	2018/10/17	2018/10/24	Fan (Carrie) Jiang

Maxxam ID: IAF926
Sample ID: PUF-COVE-OCTOBER11 (2 SAMPLES)
Matrix: PUF AND FILTER

Collected: 2018/10/11
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5803169	2018/10/17	2018/10/30	Cathy Xu
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5805555	2018/10/17	2018/10/30	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5788412	2018/10/17	2018/10/24	Fan (Carrie) Jiang

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Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

TEST SUMMARY

Maxxam ID: IAF927
Sample ID: PUF-BEACH-OCTOBER11 (2 SAMPLES)
Matrix: PUF AND FILTER
Collected: 2018/10/11
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5803169	2018/10/17	2018/10/30	Cathy Xu
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5805555	2018/10/17	2018/10/30	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5788412	2018/10/17	2018/10/24	Fan (Carrie) Jiang

Maxxam ID: IAF928
Sample ID: PUF-OPG-OCTOBER12 (2 SAMPLES)
Matrix: PUF AND FILTER
Collected: 2018/10/12
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5803169	2018/10/17	2018/10/30	Cathy Xu
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5805555	2018/10/17	2018/10/30	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5788412	2018/10/17	2018/10/24	Fan (Carrie) Jiang

Maxxam ID: IAF929
Sample ID: PUF-COVE-OCTOBER12 (2 SAMPLES)
Matrix: PUF AND FILTER
Collected: 2018/10/12
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5803169	2018/10/17	2018/10/26	Cathy Xu
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5805555	2018/10/17	2018/10/30	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5788412	2018/10/17	2018/10/24	Fan (Carrie) Jiang

Maxxam ID: IAF930
Sample ID: PUF-BEACH-OCTOBER12 (2 SAMPLES)
Matrix: PUF AND FILTER
Collected: 2018/10/12
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5803169	2018/10/17	2018/10/26	Cathy Xu
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5805555	2018/10/17	2018/10/30	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5788412	2018/10/17	2018/10/24	Fan (Carrie) Jiang

Maxxam ID: IAF931
Sample ID: PUF BLANK
Matrix: PUF AND FILTER
Collected:
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5803169	2018/10/17	2018/10/26	Cathy Xu
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5805555	2018/10/17	2018/10/30	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5788412	2018/10/17	2018/10/23	Fan (Carrie) Jiang

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GENERAL COMMENTS

Dibenzo(a,c) anthracene and Picene : These parameters are not accredited for the submitted matrix. Dibenzo(a,c)anthracene co-elutes with Dibenz(a,h)anthracene. The data reported is the total of the 2 compounds if both are present.

Triphenylene co-elutes with Chrysene. The data reported is the total of the 2 compounds if both are present.

Benzo(b)fluoranthene and Benzo(j)fluoranthene co-elute. The data reported is the total of the 2 compounds if both are present.

Results relate only to the items tested.

Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5788412	FJI	Spiked Blank	D10-2-Methylnaphthalene	2018/10/23		86	%	50 - 150
			D10-Fluoranthene	2018/10/23		98	%	50 - 150
			D10-Phenanthrene	2018/10/23		92	%	50 - 150
			D12-Benzo(a)anthracene	2018/10/23		112	%	50 - 150
			D12-Benzo(a)pyrene	2018/10/23		106	%	50 - 150
			D12-Benzo(b)fluoranthene	2018/10/23		116	%	50 - 150
			D12-Benzo(ghi)perylene	2018/10/23		104	%	50 - 150
			D12-Benzo(k)fluoranthene	2018/10/23		100	%	50 - 150
			D12-Chrysene	2018/10/23		104	%	50 - 150
			D12-Indeno(1,2,3-cd)pyrene	2018/10/23		104	%	50 - 150
			D12-Perylene	2018/10/23		104	%	50 - 150
			D14-Dibenzo(a,h)anthracene	2018/10/23		102	%	50 - 150
			D8-Acenaphthylene	2018/10/23		88	%	50 - 150
			D8-Naphthalene	2018/10/23		80	%	50 - 150
			Acenaphthene	2018/10/23		90	%	60 - 130
			Acenaphthylene	2018/10/23		95	%	60 - 130
			Anthracene	2018/10/23		95	%	60 - 130
			Benzo(a)anthracene	2018/10/23		115	%	60 - 130
			Benzo(b)fluoranthene	2018/10/23		108	%	60 - 130
			Benzo(g,h,i)perylene	2018/10/23		110	%	60 - 130
			Benzo(k)fluoranthene	2018/10/23		123	%	60 - 130
			Chrysene	2018/10/23		115	%	60 - 130
			Dibenz(a,h)anthracene	2018/10/23		115	%	60 - 130
			Fluoranthene	2018/10/23		105	%	60 - 130
			Fluorene	2018/10/23		95	%	60 - 130
			Indeno(1,2,3-cd)pyrene	2018/10/23		115	%	60 - 130
			Naphthalene	2018/10/23		95	%	60 - 130
			Phenanthrene	2018/10/23		100	%	60 - 130
			Pyrene	2018/10/23		100	%	60 - 130
5788412	FJI	RPD	Acenaphthene	2018/10/25	8.0		%	50
			Acenaphthylene	2018/10/25	5.1		%	50
			Anthracene	2018/10/25	2.6		%	50
			Benzo(a)anthracene	2018/10/25	6.3		%	50
			Benzo(b)fluoranthene	2018/10/25	15		%	50
			Benzo(g,h,i)perylene	2018/10/25	6.6		%	50
			Benzo(k)fluoranthene	2018/10/25	4.2		%	50
			Chrysene	2018/10/25	10		%	50
			Dibenz(a,h)anthracene	2018/10/25	6.3		%	50
			Fluoranthene	2018/10/25	2.4		%	50
			Fluorene	2018/10/25	5.1		%	50
			Indeno(1,2,3-cd)pyrene	2018/10/25	8.3		%	50
			Naphthalene	2018/10/25	10		%	50
			Phenanthrene	2018/10/25	0		%	50
			Pyrene	2018/10/25	0		%	50
5788412	FJI	Method Blank	D10-2-Methylnaphthalene	2018/10/23		90	%	50 - 150
			D10-Fluoranthene	2018/10/23		98	%	50 - 150
			D10-Phenanthrene	2018/10/23		96	%	50 - 150
			D12-Benzo(a)anthracene	2018/10/23		114	%	50 - 150
			D12-Benzo(a)pyrene	2018/10/23		114	%	50 - 150
			D12-Benzo(b)fluoranthene	2018/10/23		126	%	50 - 150
			D12-Benzo(ghi)perylene	2018/10/23		108	%	50 - 150

Maxxam Job #: B8R1800
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RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			D12-Benzo(k)fluoranthene	2018/10/23		102	%	50 - 150
			D12-Chrysene	2018/10/23		116	%	50 - 150
			D12-Indeno(1,2,3-cd)pyrene	2018/10/23		110	%	50 - 150
			D12-Perylene	2018/10/23		112	%	50 - 150
			D14-Dibenzo(a,h)anthracene	2018/10/23		108	%	50 - 150
			D8-Acenaphthylene	2018/10/23		94	%	50 - 150
			D8-Naphthalene	2018/10/23		88	%	50 - 150
			1-Methylnaphthalene	2018/10/23	ND, RDL=0.15		ug	
			1-Methylphenanthrene	2018/10/23	ND, RDL=0.15		ug	
			2-Chloronaphthalene	2018/10/23	ND, RDL=0.15		ug	
			2-Methylanthracene	2018/10/23	ND, RDL=0.15		ug	
			2-Methylnaphthalene	2018/10/23	ND, RDL=0.15		ug	
			3-Methylcholanthrene	2018/10/23	ND, RDL=3.0		ug	
			7,12-Dimethylbenzo(a)anthracene	2018/10/23	ND, RDL=0.60		ug	
			9,10-Dimethylanthracene	2018/10/23	ND, RDL=0.60		ug	
			Acenaphthene	2018/10/23	ND, RDL=0.075		ug	
			Acenaphthylene	2018/10/23	ND, RDL=0.075		ug	
			Anthracene	2018/10/23	ND, RDL=0.075		ug	
			Benzo(a)anthracene	2018/10/23	ND, RDL=0.075		ug	
			Benzo(a)fluorene	2018/10/23	ND, RDL=0.15		ug	
			Benzo(b)fluoranthene	2018/10/23	ND, RDL=0.075		ug	
			Benzo(b)fluorene	2018/10/23	ND, RDL=0.15		ug	
			Benzo(e)pyrene	2018/10/23	ND, RDL=0.15		ug	
			Benzo(g,h,i)perylene	2018/10/23	ND, RDL=0.075		ug	
			Benzo(k)fluoranthene	2018/10/23	ND, RDL=0.075		ug	
			Chrysene	2018/10/23	ND, RDL=0.075		ug	
			Coronene	2018/10/23	ND, RDL=0.15		ug	
			Dibenz(a,h)anthracene	2018/10/23	ND, RDL=0.075		ug	
			Dibenzo(a,c) anthracene + Picene	2018/10/23	ND, RDL=0.15		ug	

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Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Dibenzo(a,c)anthracene	2018/10/23	ND, RDL=0.050		ug	
			Dibenzo(a,e)pyrene	2018/10/23	ND, RDL=0.30		ug	
			Fluoranthene	2018/10/23	ND, RDL=0.075		ug	
			Fluorene	2018/10/23	ND, RDL=0.075		ug	
			Indeno(1,2,3-cd)pyrene	2018/10/23	ND, RDL=0.075		ug	
			Naphthalene	2018/10/23	ND, RDL=0.11		ug	
			Perylene	2018/10/23	ND, RDL=0.15		ug	
			Phenanthrene	2018/10/23	ND, RDL=0.075		ug	
			Picene	2018/10/23	ND, RDL=0.050		ug	
			Pyrene	2018/10/23	ND, RDL=0.075		ug	
			Tetralin	2018/10/23	ND, RDL=0.15		ug	
5803169	CXU	Spiked Blank	C13-1234678 HeptaCDD	2018/10/26		82	%	25 - 130
			C13-1234678 HeptaCDF	2018/10/26		75	%	25 - 130
			C13-123678 HexaCDD	2018/10/26		86	%	40 - 130
			C13-123678 HexaCDF	2018/10/26		83	%	40 - 130
			C13-12378 PentaCDD	2018/10/26		75	%	40 - 130
			C13-12378 PentaCDF	2018/10/26		60	%	40 - 130
			C13-123789 HexaCDF	2018/10/26		74	%	70 - 130
			C13-2378 TetraCDD	2018/10/26		86	%	40 - 130
			C13-2378 TetraCDF	2018/10/26		69	%	40 - 130
			C13-OCDD	2018/10/26		69	%	25 - 130
			2,3,7,8-Tetra CDD	2018/10/26		100	%	80 - 140
			1,2,3,7,8-Penta CDD	2018/10/26		99	%	80 - 140
			1,2,3,4,7,8-Hexa CDD	2018/10/26		126	%	80 - 140
			1,2,3,6,7,8-Hexa CDD	2018/10/26		112	%	80 - 140
			1,2,3,7,8,9-Hexa CDD	2018/10/26		127	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDD	2018/10/26		96	%	80 - 140
			Octa CDD	2018/10/26		98	%	80 - 140
			2,3,7,8-Tetra CDF	2018/10/26		96	%	80 - 140
			1,2,3,7,8-Penta CDF	2018/10/26		98	%	80 - 140
			2,3,4,7,8-Penta CDF	2018/10/26		115	%	80 - 140
			1,2,3,4,7,8-Hexa CDF	2018/10/26		133	%	80 - 140
			1,2,3,6,7,8-Hexa CDF	2018/10/26		113	%	80 - 140
			2,3,4,6,7,8-Hexa CDF	2018/10/26		120	%	80 - 140
			1,2,3,7,8,9-Hexa CDF	2018/10/26		124	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDF	2018/10/26		97	%	80 - 140
			1,2,3,4,7,8,9-Hepta CDF	2018/10/26		96	%	80 - 140
			Octa CDF	2018/10/26		97	%	80 - 140
5803169	CXU	RPD	2,3,7,8-Tetra CDD	2018/10/26	9.5		%	20
			1,2,3,7,8-Penta CDD	2018/10/26	2.0		%	20

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Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8-Hexa CDD	2018/10/26	2.4		%	20
			1,2,3,6,7,8-Hexa CDD	2018/10/26	2.6		%	20
			1,2,3,7,8,9-Hexa CDD	2018/10/26	3.1		%	20
			1,2,3,4,6,7,8-Hepta CDD	2018/10/26	3.1		%	20
			Octa CDD	2018/10/26	0		%	20
			2,3,7,8-Tetra CDF	2018/10/26	3.1		%	20
			1,2,3,7,8-Penta CDF	2018/10/26	1.0		%	20
			2,3,4,7,8-Penta CDF	2018/10/26	6.7		%	20
			1,2,3,4,7,8-Hexa CDF	2018/10/26	0.75		%	20
			1,2,3,6,7,8-Hexa CDF	2018/10/26	0.88		%	20
			2,3,4,6,7,8-Hexa CDF	2018/10/26	2.5		%	20
			1,2,3,7,8,9-Hexa CDF	2018/10/26	3.2		%	20
			1,2,3,4,6,7,8-Hepta CDF	2018/10/26	5.0		%	20
			1,2,3,4,7,8,9-Hepta CDF	2018/10/26	4.1		%	20
			Octa CDF	2018/10/26	0		%	20
5803169	CXU	Method Blank	C13-1234678 HeptaCDD	2018/10/25		92	%	25 - 130
			C13-1234678 HeptaCDF	2018/10/25		80	%	25 - 130
			C13-123678 HexaCDD	2018/10/25		78	%	40 - 130
			C13-123678 HexaCDF	2018/10/25		78	%	40 - 130
			C13-12378 PentaCDD	2018/10/25		79	%	40 - 130
			C13-12378 PentaCDF	2018/10/25		66	%	40 - 130
			C13-123789 HexaCDF	2018/10/25		77	%	70 - 130
			C13-2378 TetraCDD	2018/10/25		77	%	40 - 130
			C13-2378 TetraCDF	2018/10/25		63	%	40 - 130
			C13-OCDD	2018/10/25		92	%	25 - 130
			2,3,7,8-Tetra CDD	2018/10/25	ND, EDL=3.1		pg	
			1,2,3,7,8-Penta CDD	2018/10/25	ND, EDL=3.6		pg	
			1,2,3,4,7,8-Hexa CDD	2018/10/25	ND, EDL=3.8		pg	
			1,2,3,6,7,8-Hexa CDD	2018/10/25	ND, EDL=3.9		pg	
			1,2,3,7,8,9-Hexa CDD	2018/10/25	ND, EDL=3.6		pg	
			1,2,3,4,6,7,8-Hepta CDD	2018/10/25	ND, EDL=4.3		pg	
			Octa CDD	2018/10/25	ND, EDL=11 (1)		pg	
			Total Tetra CDD	2018/10/25	ND, EDL=3.1		pg	
			Total Penta CDD	2018/10/25	ND, EDL=3.6		pg	
			Total Hexa CDD	2018/10/25	ND, EDL=3.8		pg	
			Total Hepta CDD	2018/10/25	ND, EDL=4.3		pg	
			2,3,7,8-Tetra CDF	2018/10/25	ND, EDL=3.4		pg	
			1,2,3,7,8-Penta CDF	2018/10/25	ND, EDL=3.3		pg	

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Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			2,3,4,7,8-Penta CDF	2018/10/25	ND, EDL=3.3		pg	
			1,2,3,4,7,8-Hexa CDF	2018/10/25	ND, EDL=3.2		pg	
			1,2,3,6,7,8-Hexa CDF	2018/10/25	ND, EDL=3.2		pg	
			2,3,4,6,7,8-Hexa CDF	2018/10/25	ND, EDL=3.4		pg	
			1,2,3,7,8,9-Hexa CDF	2018/10/25	5.2, EDL=3.8		pg	
			1,2,3,4,6,7,8-Hepta CDF	2018/10/25	ND, EDL=3.9		pg	
			1,2,3,4,7,8,9-Hepta CDF	2018/10/25	ND, EDL=5.1		pg	
			Octa CDF	2018/10/25	11.1, EDL=4.8		pg	
			Total Tetra CDF	2018/10/25	ND, EDL=3.4		pg	
			Total Penta CDF	2018/10/25	ND, EDL=3.3		pg	
			Total Hexa CDF	2018/10/25	5.2, EDL=3.4		pg	
			Total Hepta CDF	2018/10/25	ND, EDL=4.4		pg	
			Toxic Equivalency	2018/10/25	ND, EDL=3.4		pg	
5805555	BY	Spiked Blank	Benzo(a)pyrene (13C4)	2018/10/30		105	%	50 - 150
			Benzo(a)pyrene	2018/10/30		108	%	60 - 140
5805555	BY	RPD	Benzo(a)pyrene	2018/10/30	3.8		%	50
5805555	BY	Method Blank	Benzo(a)pyrene (13C4)	2018/10/30		107	%	50 - 150
			Benzo(a)pyrene	2018/10/30	ND, RDL=0.030		ug	

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

(1) RT>2 seconds - PCDD/DF analysis-Peak maxima of monitored ions exceeds 2 secondsRT > 3 seconds - PCDD/DF analysis - Peak detected exceeds expected retention time (from internal standard) by greater than 3 seconds.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B8R1800
Report Date: 2018/11/01

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

CHARTERED
Rodney A. Major
CHEMIST

Rodney Major, Manager Organic Processing Lab

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Chain of Custody Form - AIR

Maxxam
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Mississauga Ontario ,L5N 2L8
www.maxxamanalytics.com

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Fax: (905) 817-5777

CAM FCD-01302 /2   Page ___ of ___

ANALYSIS REQUESTED

CLIENT INFORMATION SECTION

Company Name: RWDI
Project Manager: Kirk Easto
e-mail: kirk.easto@rwdi.com
Address: 600 Southgate Dr. Gielph, ON

Phone: (519) 823-1311   Fax:

Sampled by: JDF

15-Oct-18 15:21
Clayton Johnson
B8R1800
J L   AIR-FRIDGE

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time	PUF - Dioxins and Furans + PAH's (see list)
PUF - OPG - October 10 (2 samples)		8 CFM	2018/10/10	24 hrs	x
PUF - Cove - October 10 (2 samples)		8 CFM	2018/10/10	24 hrs	x
PUF - Beach - October 10 (2 samples)		8 CFM	2018/10/10	24 hrs	x
PUF - OPG - October 11 (2 samples)		8 CFM	2018/10/11	24 hrs	x
PUF - Cove - October 11 (2 samples)		8 CFM	2018/10/11	24 hrs	x
PUF - Beach - October 11 (2 samples)		8 CFM	2018/10/11	24 hrs	x
PUF - OPG - October 12 (2 samples)		8 CFM	2018/10/12	24 hrs	x
PUF - Cove - October 12 (2 samples)		8 CFM	2018/10/12	24 hrs	x
PUF - Beach - October 12 (2 samples)		8 CFM	2018/10/12	24 hrs	x
PUF Blank					

TAT Requirement

STD 10 Business day ☑
Rush 5 Business day * ☐
Rush 2 Business day * ☐
* need approval from Maxxam

PROJECT INFORMATION

Project #: 1804600
Name: St Marys Ambient
PO #: 1804600
Maxxam Quote #:
Maxxam Contact:

REPORTING REQUIREMENTS

Summary Report only ☐
EDD ☐
Regulation

Notes
Please note if this samples are "Industrial Hygiene" samples

PROJECT SPECIFIC COMMENTS
See parameter list from Kirk Easto

Client Signature: Joe Frost
Affiliation: Env Tech
Date/Time: 2018/10/05

Received by: Clayton Johnson [signature]
Affiliation:
Date/Time: 2018/10/15 15:21

13|11|11 ice

Your P.O. #: 1804600
Your Project #: 1804600
Site Location: ST MARYS AMBIENT
Your C.O.C. #: na

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2019/01/15
Report #: R5557670
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B8Q4511
Received: 2018/10/06, 10:40

Sample Matrix: Air
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Dioxins/Furans in Ambient Air (TO-9)	8	2018/10/09	2018/10/25	BRL SOP-00411	EPA TO-9 m
Dioxins/Furans in Ambient Air (TO-9)	1	2018/10/09	2018/10/26	BRL SOP-00411	EPA TO-9 m
PAHs in Ambient Air Samples by HRMS	3	2018/10/09	2018/10/29	BRL SOP-00418	CARB429 m
PAHs in Ambient Air Samples by HRMS	6	2018/10/09	2018/10/30	BRL SOP-00418	CARB429 m
PAH's in Air (CARB429mod)	3	2018/10/09	2018/10/16	BRL SOP-00201	CARB429/ARBM1/M2 m
PAH's in Air (CARB429mod)	6	2018/10/09	2018/10/17	BRL SOP-00201	CARB429/ARBM1/M2 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

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Your P.O. #: 1804600
Your Project #: 1804600
Site Location: ST MARYS AMBIENT
Your C.O.C. #: na

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2019/01/15
Report #: R5557670
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B8Q4511
Received: 2018/10/06, 10:40

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

RESULTS OF ANALYSES OF AIR

Maxxam ID		HYO557		HYO558				
Sampling Date		2018/10/02		2018/10/02				
COC Number		na		na				
	UNITS	**PUF-OPG-OCTOBER 02 (2 SAMPLES)**	**EDL**	**PUF-COVE-OCTOBER 02 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**QC Batch**
Benzo(a)pyrene	ug	0.00697	0.00045	0.00760	0.00080	0.030	N/A	5805552
Surrogate Recovery (%)								
Benzo(a)pyrene (13C4)	%	101		96				5805552

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam ID		HYO559		HYO560				
Sampling Date		2018/10/02		2018/10/03				
COC Number		na		na				
	UNITS	**PUF-BEACH-OCTOBER 02 (2 SAMPLES)**	**EDL**	**PUF-OPG-OCTOBER 03 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**QC Batch**
Benzo(a)pyrene	ug	0.0158	0.0010	0.00507	0.00053	0.030	N/A	5805552
Surrogate Recovery (%)								
Benzo(a)pyrene (13C4)	%	98		97				5805552

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam ID		HYO561		HYO562				
Sampling Date		2018/10/03		2018/10/03				
COC Number		na		na				
	UNITS	**PUF-COVE-OCTOBER 03 (2 SAMPLES)**	**EDL**	**PUF-BEACH-OCTOBER 03 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**QC Batch**
Benzo(a)pyrene	ug	0.00533	0.00058	0.0056	0.0022	0.030	N/A	5805552
Surrogate Recovery (%)								
Benzo(a)pyrene (13C4)	%	95		94				5805552

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

RESULTS OF ANALYSES OF AIR

Maxxam ID		HYO563		HYO564				
Sampling Date		2018/10/04		2018/10/04				
COC Number		na		na				
	UNITS	**PUF-OPG-OCTOBER 04 (2 SAMPLES)**	**EDL**	**PUF-COVE-OCTOBER 04 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**QC Batch**
Benzo(a)pyrene	ug	0.00409	0.00047	0.00597	0.00082	0.030	N/A	5805552
Surrogate Recovery (%)								
Benzo(a)pyrene (13C4)	%	103		107				5805552

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam ID		HYO565				
Sampling Date		2018/10/04				
COC Number		na				
	UNITS	**PUF-BEACH-OCTOBER 04 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**QC Batch**
Benzo(a)pyrene	ug	0.0200	0.00081	0.030	N/A	5805552
Surrogate Recovery (%)						
Benzo(a)pyrene (13C4)	%	103				5805552

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

SEMI-VOLATILE ORGANICS BY GC-MS (AIR)

Maxxam ID		HYO557	HYO558	HYO559			
Sampling Date		2018/10/02	2018/10/02	2018/10/02			
COC Number		na	na	na			
	UNITS	**PUF-OPG-OCTOBER 02 (2 SAMPLES)**	**PUF-COVE-OCTOBER 02 (2 SAMPLES)**	**PUF-BEACH-OCTOBER 02 (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
1-Methylnaphthalene	ug	0.66	0.69	0.78	0.15	0.030	5773444
1-Methylphenanthrene	ug	ND	ND	0.33	0.15	0.030	5773444
2-Chloronaphthalene	ug	ND	ND	ND	0.15	0.030	5773444
2-Methylanthracene	ug	ND	ND	ND	0.15	0.030	5773444
2-Methylnaphthalene	ug	1.08	1.05	1.23	0.15	0.030	5773444
3-Methylcholanthrene	ug	ND	ND	ND	3.0	0.60	5773444
7,12-Dimethylbenzo(a)anthracene	ug	ND	ND	ND	0.60	N/A	5773444
9,10-Dimethylanthracene	ug	ND	ND	ND	0.60	0.12	5773444
Acenaphthene	ug	0.180	0.210	0.270	0.075	0.030	5773444
Acenaphthylene	ug	ND	ND	ND	0.075	0.030	5773444
Anthracene	ug	ND	ND	0.150	0.075	0.030	5773444
Benzo(a)anthracene	ug	ND	ND	ND	0.075	0.030	5773444
Benzo(a)fluorene	ug	ND	ND	ND	0.15	0.030	5773444
Benzo(b)fluoranthene	ug	ND	ND	ND	0.075	0.030	5773444
Benzo(b)fluorene	ug	ND	ND	ND	0.15	0.030	5773444
Benzo(e)pyrene	ug	ND	ND	ND	0.15	0.030	5773444
Benzo(g,h,i)perylene	ug	ND	ND	ND	0.075	0.030	5773444
Benzo(k)fluoranthene	ug	ND	ND	ND	0.075	0.030	5773444
Chrysene	ug	ND	ND	0.120	0.075	0.030	5773444
Coronene	ug	ND	ND	ND	0.15	0.030	5773444
Dibenz(a,h)anthracene	ug	ND	ND	ND	0.075	0.030	5773444
Dibenzo(a,c) anthracene + Picene	ug	ND	ND	ND	0.15	0.030	5773444
Dibenzo(a,c)anthracene	ug	ND	ND	ND	0.15	0.030	5773444
Dibenzo(a,e)pyrene	ug	ND	ND	ND	0.30	0.060	5773444
Fluoranthene	ug	0.090	0.150	0.480	0.075	0.030	5773444
Fluorene	ug	0.240	0.300	0.480	0.075	0.030	5773444
Indeno(1,2,3-cd)pyrene	ug	ND	ND	ND	0.075	0.030	5773444
Naphthalene	ug	3.27	2.97	3.51	0.11	0.031	5773444
Perylene	ug	ND	ND	ND	0.15	0.030	5773444
Phenanthrene	ug	0.450	0.630	1.95	0.075	0.030	5773444
Picene	ug	ND	ND	ND	0.15	0.030	5773444
Pyrene	ug	ND	0.150	0.360	0.075	0.030	5773444
Tetralin	ug	0.36	0.45	0.54	0.15	0.030	5773444

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

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Maxxam
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Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

SEMI-VOLATILE ORGANICS BY GC-MS (AIR)

Maxxam ID		HYO557	HYO558	HYO559			
Sampling Date		2018/10/02	2018/10/02	2018/10/02			
COC Number		na	na	na			
	UNITS	**PUF-OPG-OCTOBER 02 (2 SAMPLES)**	**PUF-COVE-OCTOBER 02 (2 SAMPLES)**	**PUF-BEACH-OCTOBER 02 (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
Surrogate Recovery (%)							
D10-2-Methylnaphthalene	%	52	50	54			5773444
D10-Fluoranthene	%	60	60	66			5773444
D10-Fluorene (FS)	%	56	56	52			5773444
D10-Phenanthrene	%	58	58	66			5773444
D12-Benzo(a)anthracene	%	74	74	80			5773444
D12-Benzo(a)pyrene	%	64	62	66			5773444
D12-Benzo(b)fluoranthene	%	68	64	68			5773444
D12-Benzo(ghi)perylene	%	64	60	62			5773444
D12-Benzo(k)fluoranthene	%	64	62	66			5773444
D12-Chrysene	%	68	66	70			5773444
D12-Indeno(1,2,3-cd)pyrene	%	60	60	58			5773444
D12-Perylene	%	64	60	66			5773444
D14-Dibenzo(a,h)anthracene	%	62	60	60			5773444
D14-Terphenyl (FS)	%	60	60	62			5773444
D8-Acenaphthylene	%	56	58	60			5773444
D8-Naphthalene	%	50	50	50			5773444

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

SEMI-VOLATILE ORGANICS BY GC-MS (AIR)

Maxxam ID		HYO560	HYO561	HYO562			
Sampling Date		2018/10/03	2018/10/03	2018/10/03			
COC Number		na	na	na			
	UNITS	**PUF-OPG-OCTOBER 03 (2 SAMPLES)**	**PUF-COVE-OCTOBER 03 (2 SAMPLES)**	**PUF-BEACH-OCTOBER 03 (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
1-Methylnaphthalene	ug	0.69	0.54	0.48	0.15	0.030	5773444
1-Methylphenanthrene	ug	ND	0.15	0.24	0.15	0.030	5773444
2-Chloronaphthalene	ug	ND	ND	ND	0.15	0.030	5773444
2-Methylanthracene	ug	ND	ND	ND	0.15	0.030	5773444
2-Methylnaphthalene	ug	1.14	0.84	0.78	0.15	0.030	5773444
3-Methylcholanthrene	ug	ND	ND	ND	3.0	0.60	5773444
7,12-Dimethylbenzo(a)anthracene	ug	ND	ND	ND	0.60	N/A	5773444
9,10-Dimethylanthracene	ug	ND	ND	ND	0.60	0.12	5773444
Acenaphthene	ug	0.180	0.150	0.180	0.075	0.030	5773444
Acenaphthylene	ug	ND	ND	ND	0.075	0.030	5773444
Anthracene	ug	ND	0.150	0.090	0.075	0.030	5773444
Benzo(a)anthracene	ug	ND	ND	ND	0.075	0.030	5773444
Benzo(a)fluorene	ug	ND	ND	ND	0.15	0.030	5773444
Benzo(b)fluoranthene	ug	ND	ND	ND	0.075	0.030	5773444
Benzo(b)fluorene	ug	ND	ND	ND	0.15	0.030	5773444
Benzo(e)pyrene	ug	ND	ND	ND	0.15	0.030	5773444
Benzo(g,h,i)perylene	ug	ND	ND	ND	0.075	0.030	5773444
Benzo(k)fluoranthene	ug	ND	ND	ND	0.075	0.030	5773444
Chrysene	ug	ND	ND	ND	0.075	0.030	5773444
Coronene	ug	ND	ND	ND	0.15	0.030	5773444
Dibenz(a,h)anthracene	ug	ND	ND	ND	0.075	0.030	5773444
Dibenzo(a,c) anthracene + Picene	ug	ND	ND	ND	0.15	0.030	5773444
Dibenzo(a,c)anthracene	ug	ND	ND	ND	0.15	0.030	5773444
Dibenzo(a,e)pyrene	ug	ND	ND	ND	0.30	0.060	5773444
Fluoranthene	ug	0.150	0.270	0.420	0.075	0.030	5773444
Fluorene	ug	0.240	0.480	0.390	0.075	0.030	5773444
Indeno(1,2,3-cd)pyrene	ug	ND	ND	ND	0.075	0.030	5773444
Naphthalene	ug	2.70	2.37	2.19	0.11	0.031	5773444
Perylene	ug	ND	ND	ND	0.15	0.030	5773444
Phenanthrene	ug	0.540	1.23	1.50	0.075	0.030	5773444
Picene	ug	ND	ND	ND	0.15	0.030	5773444
Pyrene	ug	0.090	0.270	0.300	0.075	0.030	5773444
Tetralin	ug	0.57	0.27	0.27	0.15	0.030	5773444

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

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Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

SEMI-VOLATILE ORGANICS BY GC-MS (AIR)

Maxxam ID		HYO560	HYO561	HYO562			
Sampling Date		2018/10/03	2018/10/03	2018/10/03			
COC Number		na	na	na			
	UNITS	**PUF-OPG-OCTOBER 03 (2 SAMPLES)**	**PUF-COVE-OCTOBER 03 (2 SAMPLES)**	**PUF-BEACH-OCTOBER 03 (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
Surrogate Recovery (%)							
D10-2-Methylnaphthalene	%	54	58	52			5773444
D10-Fluoranthene	%	58	68	64			5773444
D10-Fluorene (FS)	%	56	60	56			5773444
D10-Phenanthrene	%	58	66	62			5773444
D12-Benzo(a)anthracene	%	74	84	80			5773444
D12-Benzo(a)pyrene	%	60	68	66			5773444
D12-Benzo(b)fluoranthene	%	66	74	68			5773444
D12-Benzo(ghi)perylene	%	62	70	64			5773444
D12-Benzo(k)fluoranthene	%	62	68	66			5773444
D12-Chrysene	%	66	74	70			5773444
D12-Indeno(1,2,3-cd)pyrene	%	60	62	60			5773444
D12-Perylene	%	60	68	64			5773444
D14-Dibenzo(a,h)anthracene	%	60	64	60			5773444
D14-Terphenyl (FS)	%	56	66	62			5773444
D8-Acenaphthylene	%	56	64	60			5773444
D8-Naphthalene	%	50	52	50			5773444

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

SEMI-VOLATILE ORGANICS BY GC-MS (AIR)

Maxxam ID		HYO563	HYO564	HYO565			
Sampling Date		2018/10/04	2018/10/04	2018/10/04			
COC Number		na	na	na			
	UNITS	**PUF-OPG-OCTOBER 04 (2 SAMPLES)**	**PUF-COVE-OCTOBER 04 (2 SAMPLES)**	**PUF-BEACH-OCTOBER 04 (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
1-Methylnaphthalene	ug	0.36	0.33	0.27	0.15	0.030	5773444
1-Methylphenanthrene	ug	ND	ND	0.24	0.15	0.030	5773444
2-Chloronaphthalene	ug	ND	ND	ND	0.15	0.030	5773444
2-Methylanthracene	ug	ND	ND	ND	0.15	0.030	5773444
2-Methylnaphthalene	ug	0.57	0.51	0.45	0.15	0.030	5773444
3-Methylcholanthrene	ug	ND	ND	ND	3.0	0.60	5773444
7,12-Dimethylbenzo(a)anthracene	ug	ND	ND	ND	0.60	N/A	5773444
9,10-Dimethylanthracene	ug	ND	ND	ND	0.60	0.12	5773444
Acenaphthene	ug	0.090	0.180	0.150	0.075	0.030	5773444
Acenaphthylene	ug	ND	ND	ND	0.075	0.030	5773444
Anthracene	ug	ND	ND	0.090	0.075	0.030	5773444
Benzo(a)anthracene	ug	ND	ND	ND	0.075	0.030	5773444
Benzo(a)fluorene	ug	ND	ND	ND	0.15	0.030	5773444
Benzo(b)fluoranthene	ug	ND	ND	ND	0.075	0.030	5773444
Benzo(b)fluorene	ug	ND	ND	ND	0.15	0.030	5773444
Benzo(e)pyrene	ug	ND	ND	ND	0.15	0.030	5773444
Benzo(g,h,i)perylene	ug	ND	ND	ND	0.075	0.030	5773444
Benzo(k)fluoranthene	ug	ND	ND	ND	0.075	0.030	5773444
Chrysene	ug	ND	ND	ND	0.075	0.030	5773444
Coronene	ug	ND	ND	ND	0.15	0.030	5773444
Dibenz(a,h)anthracene	ug	ND	ND	ND	0.075	0.030	5773444
Dibenzo(a,c) anthracene + Picene	ug	ND	ND	ND	0.15	0.030	5773444
Dibenzo(a,c)anthracene	ug	ND	ND	ND	0.15	0.030	5773444
Dibenzo(a,e)pyrene	ug	ND	ND	ND	0.30	0.060	5773444
Fluoranthene	ug	ND	0.090	0.300	0.075	0.030	5773444
Fluorene	ug	0.150	0.210	0.270	0.075	0.030	5773444
Indeno(1,2,3-cd)pyrene	ug	ND	ND	ND	0.075	0.030	5773444
Naphthalene	ug	1.59	1.38	1.11	0.11	0.031	5773444
Perylene	ug	ND	ND	ND	0.15	0.030	5773444
Phenanthrene	ug	0.300	0.480	1.20	0.075	0.030	5773444
Picene	ug	ND	ND	ND	0.15	0.030	5773444
Pyrene	ug	ND	0.090	0.240	0.075	0.030	5773444
Tetralin	ug	0.21	0.18	0.18	0.15	0.030	5773444

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

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SEMI-VOLATILE ORGANICS BY GC-MS (AIR)

Maxxam ID		HYO563	HYO564	HYO565			
Sampling Date		2018/10/04	2018/10/04	2018/10/04			
COC Number		na	na	na			
	UNITS	**PUF-OPG-OCTOBER 04 (2 SAMPLES)**	**PUF-COVE-OCTOBER 04 (2 SAMPLES)**	**PUF-BEACH-OCTOBER 04 (2 SAMPLES)**	**RDL**	**MDL**	**QC Batch**
Surrogate Recovery (%)							
D10-2-Methylnaphthalene	%	54	56	50			5773444
D10-Fluoranthene	%	60	62	64			5773444
D10-Fluorene (FS)	%	58	58	56			5773444
D10-Phenanthrene	%	60	62	62			5773444
D12-Benzo(a)anthracene	%	80	78	76			5773444
D12-Benzo(a)pyrene	%	66	66	64			5773444
D12-Benzo(b)fluoranthene	%	68	70	66			5773444
D12-Benzo(ghi)perylene	%	66	66	62			5773444
D12-Benzo(k)fluoranthene	%	68	66	60			5773444
D12-Chrysene	%	68	70	66			5773444
D12-Indeno(1,2,3-cd)pyrene	%	62	62	58			5773444
D12-Perylene	%	64	62	60			5773444
D14-Dibenzo(a,h)anthracene	%	62	64	58			5773444
D14-Terphenyl (FS)	%	60	58	60			5773444
D8-Acenaphthylene	%	60	60	58			5773444
D8-Naphthalene	%	52	52	50			5773444

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (AIR)

Maxxam ID		HYO557							
Sampling Date		2018/10/02							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	**PUF-OPG-OCTOBER 02 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	ND	3.6	30	6.0	1.00	3.60		5803161
1,2,3,7,8-Penta CDD *	pg	ND	3.4	30	6.0	1.00	3.40		5803161
1,2,3,4,7,8-Hexa CDD *	pg	ND	4.1	30	6.0	0.100	0.410		5803161
1,2,3,6,7,8-Hexa CDD *	pg	ND	4.0	30	6.0	0.100	0.400		5803161
1,2,3,7,8,9-Hexa CDD *	pg	ND	4.0	30	6.0	0.100	0.400		5803161
1,2,3,4,6,7,8-Hepta CDD *	pg	11.4	4.3	30	9.0	0.0100	0.114		5803161
Octa CDD *	pg	38.1	3.5	300	9.0	0.000300	0.0114		5803161
Total Tetra CDD *	pg	ND	3.6	30	N/A			0	5803161
Total Penta CDD *	pg	ND	3.4	30	N/A			0	5803161
Total Hexa CDD *	pg	ND (1)	5.8	30	N/A			0	5803161
Total Hepta CDD *	pg	22.3	4.3	30	N/A			2	5803161
2,3,7,8-Tetra CDF **	pg	ND	3.6	30	6.0	0.100	0.360		5803161
1,2,3,7,8-Penta CDF **	pg	ND	3.9	30	6.0	0.0300	0.117		5803161
2,3,4,7,8-Penta CDF **	pg	ND	4.0	30	6.0	0.300	1.20		5803161
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.6	30	6.0	0.100	0.360		5803161
1,2,3,6,7,8-Hexa CDF **	pg	ND	3.5	30	6.0	0.100	0.350		5803161
2,3,4,6,7,8-Hexa CDF **	pg	ND	4.1	30	6.0	0.100	0.410		5803161
1,2,3,7,8,9-Hexa CDF **	pg	ND	4.7	30	6.0	0.100	0.470		5803161
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	2.9	30	9.0	0.0100	0.0290		5803161
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	4.2	30	6.0	0.0100	0.0420		5803161
Octa CDF **	pg	ND	4.2	300	15	0.000300	0.00126		5803161
Total Tetra CDF **	pg	ND	3.6	30	N/A			0	5803161
Total Penta CDF **	pg	ND	4.0	30	N/A			0	5803161
Total Hexa CDF **	pg	ND	4.0	30	N/A			0	5803161
Total Hepta CDF **	pg	ND	3.5	30	N/A			0	5803161

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (AIR)

Maxxam ID		HYO557							
Sampling Date		2018/10/02							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	**PUF-OPG-OCTOBER 02 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Toxic Equivalency	pg	ND	3.6	N/A	N/A				5803161
TOTAL TOXIC EQUIVALENCY	pg						11.7		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	89							5803161
C13-1234678 HeptaCDF **	%	87							5803161
C13-123478 HexaCDD *	%	123							5803161
C13-123478 HexaCDF **	%	89							5803161
C13-1234789 HeptaCDF **	%	99							5803161
C13-123678 HexaCDD *	%	74							5803161
C13-123678 HexaCDF **	%	87							5803161
C13-12378 PentaCDD *	%	103							5803161
C13-12378 PentaCDF **	%	96							5803161
C13-123789 HexaCDF **	%	71							5803161
C13-23478 PentaCDF **	%	112							5803161
C13-2378 TetraCDD *	%	104							5803161
C13-2378 TetraCDF **	%	81							5803161
C13-OCDD *	%	87							5803161
Cl37-2378 TetraCDD *	%	77							5803161

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (AIR)

Maxxam ID		HYO558							
Sampling Date		2018/10/02							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	PUF-COVE-OCTOBER 02 (2 SAMPLES)	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	ND	4.2	30	6.0	1.00	4.20		5803161
1,2,3,7,8-Penta CDD *	pg	ND	3.6	30	6.0	1.00	3.60		5803161
1,2,3,4,7,8-Hexa CDD *	pg	ND	4.2	30	6.0	0.100	0.420		5803161
1,2,3,6,7,8-Hexa CDD *	pg	ND	4.1	30	6.0	0.100	0.410		5803161
1,2,3,7,8,9-Hexa CDD *	pg	ND	4.1	30	6.0	0.100	0.410		5803161
1,2,3,4,6,7,8-Hepta CDD *	pg	13.8	3.3	30	9.0	0.0100	0.138		5803161
Octa CDD *	pg	53.3	4.0	300	9.0	0.000300	0.0160		5803161
Total Tetra CDD *	pg	ND	4.2	30	N/A			0	5803161
Total Penta CDD *	pg	ND	3.6	30	N/A			0	5803161
Total Hexa CDD *	pg	ND (1)	4.7	30	N/A			0	5803161
Total Hepta CDD *	pg	26.9	3.3	30	N/A			2	5803161
2,3,7,8-Tetra CDF **	pg	ND	4.2	30	6.0	0.100	0.420		5803161
1,2,3,7,8-Penta CDF **	pg	ND	4.0	30	6.0	0.0300	0.120		5803161
2,3,4,7,8-Penta CDF **	pg	ND	4.1	30	6.0	0.300	1.23		5803161
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.2	30	6.0	0.100	0.320		5803161
1,2,3,6,7,8-Hexa CDF **	pg	ND	3.1	30	6.0	0.100	0.310		5803161
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.6	30	6.0	0.100	0.360		5803161
1,2,3,7,8,9-Hexa CDF **	pg	ND	4.1	30	6.0	0.100	0.410		5803161
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	3.1	30	9.0	0.0100	0.0310		5803161
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	4.4	30	6.0	0.0100	0.0440		5803161
Octa CDF **	pg	ND	4.1	300	15	0.000300	0.00123		5803161
Total Tetra CDF **	pg	ND	4.2	30	N/A			0	5803161
Total Penta CDF **	pg	ND	4.1	30	N/A			0	5803161
Total Hexa CDF **	pg	ND	3.5	30	N/A			0	5803161
Total Hepta CDF **	pg	ND	3.6	30	N/A			0	5803161

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (AIR)

Maxxam ID		HYO558							
Sampling Date		2018/10/02							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	**PUF-COVE-OCTOBER 02 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Toxic Equivalency	pg	ND	4.2	N/A	N/A				5803161
TOTAL TOXIC EQUIVALENCY	pg						12.4		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	95							5803161
C13-1234678 HeptaCDF **	%	90							5803161
C13-123478 HexaCDD *	%	115							5803161
C13-123478 HexaCDF **	%	86							5803161
C13-1234789 HeptaCDF **	%	103							5803161
C13-123678 HexaCDD *	%	79							5803161
C13-123678 HexaCDF **	%	93							5803161
C13-12378 PentaCDD *	%	116							5803161
C13-12378 PentaCDF **	%	102							5803161
C13-123789 HexaCDF **	%	74							5803161
C13-23478 PentaCDF **	%	118							5803161
C13-2378 TetraCDD *	%	104							5803161
C13-2378 TetraCDF **	%	83							5803161
C13-OCDD *	%	93							5803161
Cl37-2378 TetraCDD *	%	78							5803161

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
* CDD = Chloro Dibenzo-p-Dioxin
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Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (AIR)

Maxxam ID		HYO559							
Sampling Date		2018/10/02							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	PUF-BEACH-OCTOBER 02 (2 SAMPLES)	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	ND	3.8	30	6.0	1.00	3.80		5803161
1,2,3,7,8-Penta CDD *	pg	ND	3.9	30	6.0	1.00	3.90		5803161
1,2,3,4,7,8-Hexa CDD *	pg	ND	4.2	30	6.0	0.100	0.420		5803161
1,2,3,6,7,8-Hexa CDD *	pg	ND	4.1	30	6.0	0.100	0.410		5803161
1,2,3,7,8,9-Hexa CDD *	pg	ND	4.1	30	6.0	0.100	0.410		5803161
1,2,3,4,6,7,8-Hepta CDD *	pg	9.6	3.1	30	9.0	0.0100	0.0960		5803161
Octa CDD *	pg	30.2	3.1	300	9.0	0.000300	0.00906		5803161
Total Tetra CDD *	pg	ND	3.8	30	N/A			0	5803161
Total Penta CDD *	pg	ND	3.9	30	N/A			0	5803161
Total Hexa CDD *	pg	ND (1)	7.7	30	N/A			0	5803161
Total Hepta CDD *	pg	18.9	3.1	30	N/A			2	5803161
2,3,7,8-Tetra CDF **	pg	ND	4.5	30	6.0	0.100	0.450		5803161
1,2,3,7,8-Penta CDF **	pg	ND	3.5	30	6.0	0.0300	0.105		5803161
2,3,4,7,8-Penta CDF **	pg	ND	3.6	30	6.0	0.300	1.08		5803161
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.4	30	6.0	0.100	0.340		5803161
1,2,3,6,7,8-Hexa CDF **	pg	ND	3.3	30	6.0	0.100	0.330		5803161
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.8	30	6.0	0.100	0.380		5803161
1,2,3,7,8,9-Hexa CDF **	pg	ND	4.4	30	6.0	0.100	0.440		5803161
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	3.4	30	9.0	0.0100	0.0340		5803161
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	4.9	30	6.0	0.0100	0.0490		5803161
Octa CDF **	pg	ND	3.8	300	15	0.000300	0.00114		5803161
Total Tetra CDF **	pg	ND	4.5	30	N/A			0	5803161
Total Penta CDF **	pg	ND	3.5	30	N/A			0	5803161
Total Hexa CDF **	pg	ND	3.7	30	N/A			0	5803161
Total Hepta CDF **	pg	ND	4.0	30	N/A			0	5803161

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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DIOXINS AND FURANS BY HRMS (AIR)

Maxxam ID		HYO559							
Sampling Date		2018/10/02							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	**PUF-BEACH-OCTOBER 02 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Toxic Equivalency	pg	ND	4.5	N/A	N/A				5803161
TOTAL TOXIC EQUIVALENCY	pg						12.3		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	90							5803161
C13-1234678 HeptaCDF **	%	86							5803161
C13-123478 HexaCDD *	%	122							5803161
C13-123478 HexaCDF **	%	89							5803161
C13-1234789 HeptaCDF **	%	103							5803161
C13-123678 HexaCDD *	%	75							5803161
C13-123678 HexaCDF **	%	88							5803161
C13-12378 PentaCDD *	%	111							5803161
C13-12378 PentaCDF **	%	100							5803161
C13-123789 HexaCDF **	%	74							5803161
C13-23478 PentaCDF **	%	115							5803161
C13-2378 TetraCDD *	%	104							5803161
C13-2378 TetraCDF **	%	78							5803161
C13-OCDD *	%	86							5803161
Cl37-2378 TetraCDD *	%	77							5803161

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (AIR)

Maxxam ID		HYO560							
Sampling Date		2018/10/03							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	**PUF-OPG-OCTOBER 03 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	ND	3.5	30	6.0	1.00	3.50		5803161
1,2,3,7,8-Penta CDD *	pg	ND	3.6	30	6.0	1.00	3.60		5803161
1,2,3,4,7,8-Hexa CDD *	pg	ND	4.3	30	6.0	0.100	0.430		5803161
1,2,3,6,7,8-Hexa CDD *	pg	ND	4.2	30	6.0	0.100	0.420		5803161
1,2,3,7,8,9-Hexa CDD *	pg	ND	4.2	30	6.0	0.100	0.420		5803161
1,2,3,4,6,7,8-Hepta CDD *	pg	10.3	3.2	30	9.0	0.0100	0.103		5803161
Octa CDD *	pg	32.1	3.5	300	9.0	0.000300	0.00963		5803161
Total Tetra CDD *	pg	ND	3.5	30	N/A			0	5803161
Total Penta CDD *	pg	ND	3.6	30	N/A			0	5803161
Total Hexa CDD *	pg	ND (1)	5.1	30	N/A			0	5803161
Total Hepta CDD *	pg	19.6	3.2	30	N/A			2	5803161
2,3,7,8-Tetra CDF **	pg	ND	4.2	30	6.0	0.100	0.420		5803161
1,2,3,7,8-Penta CDF **	pg	ND	4.4	30	6.0	0.0300	0.132		5803161
2,3,4,7,8-Penta CDF **	pg	ND	4.5	30	6.0	0.300	1.35		5803161
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.2	30	6.0	0.100	0.320		5803161
1,2,3,6,7,8-Hexa CDF **	pg	ND	3.1	30	6.0	0.100	0.310		5803161
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.6	30	6.0	0.100	0.360		5803161
1,2,3,7,8,9-Hexa CDF **	pg	ND	4.1	30	6.0	0.100	0.410		5803161
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	2.9	30	9.0	0.0100	0.0290		5803161
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	4.2	30	6.0	0.0100	0.0420		5803161
Octa CDF **	pg	ND	3.2	300	15	0.000300	0.000960		5803161
Total Tetra CDF **	pg	ND	4.2	30	N/A			0	5803161
Total Penta CDF **	pg	ND	4.5	30	N/A			0	5803161
Total Hexa CDF **	pg	ND	3.5	30	N/A			0	5803161
Total Hepta CDF **	pg	ND	3.4	30	N/A			0	5803161

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

ND = Not detected

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (AIR)

Maxxam ID		HYO560							
Sampling Date		2018/10/03							
COC Number		na				**TOXIC EQUIVALENCY**		# of	
	UNITS	**PUF-OPG-OCTOBER 03 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Toxic Equivalency	pg	ND	4.2	N/A	N/A				5803161
TOTAL TOXIC EQUIVALENCY	pg						11.9		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	86							5803161
C13-1234678 HeptaCDF **	%	83							5803161
C13-123478 HexaCDD *	%	119							5803161
C13-123478 HexaCDF **	%	88							5803161
C13-1234789 HeptaCDF **	%	103							5803161
C13-123678 HexaCDD *	%	72							5803161
C13-123678 HexaCDF **	%	83							5803161
C13-12378 PentaCDD *	%	113							5803161
C13-12378 PentaCDF **	%	102							5803161
C13-123789 HexaCDF **	%	69 (1)							5803161
C13-23478 PentaCDF **	%	115							5803161
C13-2378 TetraCDD *	%	104							5803161
C13-2378 TetraCDF **	%	81							5803161
C13-OCDD *	%	83							5803161
Cl37-2378 TetraCDD *	%	78							5803161

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan
(1) Recovery outside method acceptance criteria.
Minimal impact on data

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Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (AIR)

Maxxam ID		HYO561							
Sampling Date		2018/10/03							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	**PUF-COVE-OCTOBER 03 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	ND	3.2	30	6.0	1.00	3.20		5803161
1,2,3,7,8-Penta CDD *	pg	ND	3.9	30	6.0	1.00	3.90		5803161
1,2,3,4,7,8-Hexa CDD *	pg	ND	4.0	30	6.0	0.100	0.400		5803161
1,2,3,6,7,8-Hexa CDD *	pg	ND	3.9	30	6.0	0.100	0.390		5803161
1,2,3,7,8,9-Hexa CDD *	pg	ND	3.9	30	6.0	0.100	0.390		5803161
1,2,3,4,6,7,8-Hepta CDD *	pg	8.8	3.5	30	9.0	0.0100	0.0880		5803161
Octa CDD *	pg	32.1	3.8	300	9.0	0.000300	0.00963		5803161
Total Tetra CDD *	pg	ND	3.2	30	N/A			0	5803161
Total Penta CDD *	pg	ND	3.9	30	N/A			0	5803161
Total Hexa CDD *	pg	7.4	3.9	30	N/A			1	5803161
Total Hepta CDD *	pg	18.0	3.5	30	N/A			2	5803161
2,3,7,8-Tetra CDF **	pg	ND	4.2	30	6.0	0.100	0.420		5803161
1,2,3,7,8-Penta CDF **	pg	ND	4.3	30	6.0	0.0300	0.129		5803161
2,3,4,7,8-Penta CDF **	pg	ND	4.4	30	6.0	0.300	1.32		5803161
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.3	30	6.0	0.100	0.330		5803161
1,2,3,6,7,8-Hexa CDF **	pg	ND	3.2	30	6.0	0.100	0.320		5803161
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.7	30	6.0	0.100	0.370		5803161
1,2,3,7,8,9-Hexa CDF **	pg	ND	4.2	30	6.0	0.100	0.420		5803161
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	2.6	30	9.0	0.0100	0.0260		5803161
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	3.7	30	6.0	0.0100	0.0370		5803161
Octa CDF **	pg	ND	4.3	300	15	0.000300	0.00129		5803161
Total Tetra CDF **	pg	ND	4.2	30	N/A			0	5803161
Total Penta CDF **	pg	ND	4.3	30	N/A			0	5803161
Total Hexa CDF **	pg	ND	3.6	30	N/A			0	5803161
Total Hepta CDF **	pg	ND	3.0	30	N/A			0	5803161
Toxic Equivalency	pg	ND	4.2	N/A	N/A				5803161

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (AIR)

Maxxam ID		HYO561							
Sampling Date		2018/10/03							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	**PUF-COVE-OCTOBER 03 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
TOTAL TOXIC EQUIVALENCY	pg						11.8		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	85							5803161
C13-1234678 HeptaCDF **	%	80							5803161
C13-123478 HexaCDD *	%	118							5803161
C13-123478 HexaCDF **	%	89							5803161
C13-1234789 HeptaCDF **	%	107							5803161
C13-123678 HexaCDD *	%	72							5803161
C13-123678 HexaCDF **	%	79							5803161
C13-12378 PentaCDD *	%	124							5803161
C13-12378 PentaCDF **	%	109							5803161
C13-123789 HexaCDF **	%	70							5803161
C13-23478 PentaCDF **	%	120							5803161
C13-2378 TetraCDD *	%	104							5803161
C13-2378 TetraCDF **	%	80							5803161
C13-OCDD *	%	83							5803161
Cl37-2378 TetraCDD *	%	78							5803161

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (AIR)

Maxxam ID		HYO562							
Sampling Date		2018/10/03							
COC Number		na				**TOXIC EQUIVALENCY**		# of	
	UNITS	**PUF-BEACH-OCTOBER 03 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	ND	4.3	30	6.0	1.00	4.30		5803161
1,2,3,7,8-Penta CDD *	pg	ND	3.8	30	6.0	1.00	3.80		5803161
1,2,3,4,7,8-Hexa CDD *	pg	ND	4.5	30	6.0	0.100	0.450		5803161
1,2,3,6,7,8-Hexa CDD *	pg	ND	4.4	30	6.0	0.100	0.440		5803161
1,2,3,7,8,9-Hexa CDD *	pg	ND	4.3	30	6.0	0.100	0.430		5803161
1,2,3,4,6,7,8-Hepta CDD *	pg	9.3	3.5	30	9.0	0.0100	0.0930		5803161
Octa CDD *	pg	31.0	4.1	300	9.0	0.000300	0.00930		5803161
Total Tetra CDD *	pg	ND	4.3	30	N/A			0	5803161
Total Penta CDD *	pg	ND	3.8	30	N/A			0	5803161
Total Hexa CDD *	pg	ND	4.4	30	N/A			0	5803161
Total Hepta CDD *	pg	17.9	3.5	30	N/A			2	5803161
2,3,7,8-Tetra CDF **	pg	ND	4.3	30	6.0	0.100	0.430		5803161
1,2,3,7,8-Penta CDF **	pg	ND	4.1	30	6.0	0.0300	0.123		5803161
2,3,4,7,8-Penta CDF **	pg	ND	4.1	30	6.0	0.300	1.23		5803161
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.5	30	6.0	0.100	0.350		5803161
1,2,3,6,7,8-Hexa CDF **	pg	ND	3.4	30	6.0	0.100	0.340		5803161
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.9	30	6.0	0.100	0.390		5803161
1,2,3,7,8,9-Hexa CDF **	pg	ND	4.5	30	6.0	0.100	0.450		5803161
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	3.0	30	9.0	0.0100	0.0300		5803161
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	4.3	30	6.0	0.0100	0.0430		5803161
Octa CDF **	pg	ND	4.1	300	15	0.000300	0.00123		5803161
Total Tetra CDF **	pg	ND	4.3	30	N/A			0	5803161
Total Penta CDF **	pg	ND	4.1	30	N/A			0	5803161
Total Hexa CDF **	pg	ND	3.8	30	N/A			0	5803161
Total Hepta CDF **	pg	ND	3.5	30	N/A			0	5803161
Toxic Equivalency	pg	ND	4.3	N/A	N/A				5803161

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (AIR)

Maxxam ID		HYO562							
Sampling Date		2018/10/03							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	**PUF-BEACH-OCTOBER 03 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
TOTAL TOXIC EQUIVALENCY	pg						12.9		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	82							5803161
C13-1234678 HeptaCDF **	%	78							5803161
C13-123478 HexaCDD *	%	125							5803161
C13-123478 HexaCDF **	%	87							5803161
C13-1234789 HeptaCDF **	%	105							5803161
C13-123678 HexaCDD *	%	68							5803161
C13-123678 HexaCDF **	%	81							5803161
C13-12378 PentaCDD *	%	115							5803161
C13-12378 PentaCDF **	%	104							5803161
C13-123789 HexaCDF **	%	72							5803161
C13-23478 PentaCDF **	%	117							5803161
C13-2378 TetraCDD *	%	104							5803161
C13-2378 TetraCDF **	%	80							5803161
C13-OCDD *	%	79							5803161
Cl37-2378 TetraCDD *	%	78							5803161

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (AIR)

Maxxam ID		HYO563							
Sampling Date		2018/10/04							
COC Number		na				**TOXIC EQUIVALENCY**		# of	
	UNITS	**PUF-OPG-OCTOBER 04 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	ND	4.1	30	6.0	1.00	4.10		5803161
1,2,3,7,8-Penta CDD *	pg	ND	3.3	30	6.0	1.00	3.30		5803161
1,2,3,4,7,8-Hexa CDD *	pg	ND	4.1	30	6.0	0.100	0.410		5803161
1,2,3,6,7,8-Hexa CDD *	pg	ND	4.0	30	6.0	0.100	0.400		5803161
1,2,3,7,8,9-Hexa CDD *	pg	ND	4.0	30	6.0	0.100	0.400		5803161
1,2,3,4,6,7,8-Hepta CDD *	pg	3.7	3.5	30	9.0	0.0100	0.0370		5803161
Octa CDD *	pg	11.6	4.2	300	9.0	0.000300	0.00348		5803161
Total Tetra CDD *	pg	ND	4.1	30	N/A			0	5803161
Total Penta CDD *	pg	ND	3.3	30	N/A			0	5803161
Total Hexa CDD *	pg	ND	4.0	30	N/A			0	5803161
Total Hepta CDD *	pg	3.7	3.5	30	N/A			1	5803161
2,3,7,8-Tetra CDF **	pg	ND	4.3	30	6.0	0.100	0.430		5803161
1,2,3,7,8-Penta CDF **	pg	ND	4.1	30	6.0	0.0300	0.123		5803161
2,3,4,7,8-Penta CDF **	pg	ND	4.2	30	6.0	0.300	1.26		5803161
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.4	30	6.0	0.100	0.340		5803161
1,2,3,6,7,8-Hexa CDF **	pg	ND	3.3	30	6.0	0.100	0.330		5803161
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.8	30	6.0	0.100	0.380		5803161
1,2,3,7,8,9-Hexa CDF **	pg	ND	4.3	30	6.0	0.100	0.430		5803161
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	2.7	30	9.0	0.0100	0.0270		5803161
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	3.9	30	6.0	0.0100	0.0390		5803161
Octa CDF **	pg	ND	4.4	300	15	0.000300	0.00132		5803161
Total Tetra CDF **	pg	ND	4.3	30	N/A			0	5803161
Total Penta CDF **	pg	ND	4.1	30	N/A			0	5803161
Total Hexa CDF **	pg	ND	3.6	30	N/A			0	5803161
Total Hepta CDF **	pg	ND	3.2	30	N/A			0	5803161
Toxic Equivalency	pg	ND	4.3	N/A	N/A				5803161

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan

DIOXINS AND FURANS BY HRMS (AIR)

Maxxam ID		HYO563							
Sampling Date		2018/10/04							
COC Number		na				**TOXIC EQUIVALENCY**		# of	
	UNITS	**PUF-OPG-OCTOBER 04 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
TOTAL TOXIC EQUIVALENCY	pg						12.0		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	89							5803161
C13-1234678 HeptaCDF **	%	85							5803161
C13-123478 HexaCDD *	%	115							5803161
C13-123478 HexaCDF **	%	86							5803161
C13-1234789 HeptaCDF **	%	104							5803161
C13-123678 HexaCDD *	%	77							5803161
C13-123678 HexaCDF **	%	86							5803161
C13-12378 PentaCDD *	%	115							5803161
C13-12378 PentaCDF **	%	102							5803161
C13-123789 HexaCDF **	%	73							5803161
C13-23478 PentaCDF **	%	119							5803161
C13-2378 TetraCDD *	%	104							5803161
C13-2378 TetraCDF **	%	81							5803161
C13-OCDD *	%	88							5803161
Cl37-2378 TetraCDD *	%	78							5803161

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

** CDF = Chloro Dibenzo-p-Furan

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Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (AIR)

Maxxam ID		HYO564							
Sampling Date		2018/10/04							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	**PUF-COVE-OCTOBER 04 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	ND	3.3	30	6.0	1.00	3.30		5803161
1,2,3,7,8-Penta CDD *	pg	ND	3.8	30	6.0	1.00	3.80		5803161
1,2,3,4,7,8-Hexa CDD *	pg	ND	4.5	30	6.0	0.100	0.450		5803161
1,2,3,6,7,8-Hexa CDD *	pg	ND	4.4	30	6.0	0.100	0.440		5803161
1,2,3,7,8,9-Hexa CDD *	pg	ND	4.4	30	6.0	0.100	0.440		5803161
1,2,3,4,6,7,8-Hepta CDD *	pg	ND	4.1	30	9.0	0.0100	0.0410		5803161
Octa CDD *	pg	8.5	3.9	300	9.0	0.000300	0.00255		5803161
Total Tetra CDD *	pg	ND	3.3	30	N/A			0	5803161
Total Penta CDD *	pg	ND	3.8	30	N/A			0	5803161
Total Hexa CDD *	pg	ND	4.5	30	N/A			0	5803161
Total Hepta CDD *	pg	ND	4.1	30	N/A			0	5803161
2,3,7,8-Tetra CDF **	pg	ND	4.0	30	6.0	0.100	0.400		5803161
1,2,3,7,8-Penta CDF **	pg	ND	4.2	30	6.0	0.0300	0.126		5803161
2,3,4,7,8-Penta CDF **	pg	ND	4.3	30	6.0	0.300	1.29		5803161
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.4	30	6.0	0.100	0.340		5803161
1,2,3,6,7,8-Hexa CDF **	pg	ND	3.3	30	6.0	0.100	0.330		5803161
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.9	30	6.0	0.100	0.390		5803161
1,2,3,7,8,9-Hexa CDF **	pg	ND	4.4	30	6.0	0.100	0.440		5803161
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	2.5	30	9.0	0.0100	0.0250		5803161
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	3.6	30	6.0	0.0100	0.0360		5803161
Octa CDF **	pg	ND	4.5	300	15	0.000300	0.00135		5803161
Total Tetra CDF **	pg	ND	4.0	30	N/A			0	5803161
Total Penta CDF **	pg	ND	4.3	30	N/A			0	5803161
Total Hexa CDF **	pg	ND	3.7	30	N/A			0	5803161
Total Hepta CDF **	pg	ND	2.9	30	N/A			0	5803161
Toxic Equivalency	pg	ND	4.0	N/A	N/A				5803161

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (AIR)

Maxxam ID		HYO564							
Sampling Date		2018/10/04							
COC Number		na				**TOXIC EQUIVALENCY**		# of	
	UNITS	**PUF-COVE-OCTOBER 04 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
TOTAL TOXIC EQUIVALENCY	pg						11.9		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	85							5803161
C13-1234678 HeptaCDF **	%	78							5803161
C13-123478 HexaCDD *	%	121							5803161
C13-123478 HexaCDF **	%	88							5803161
C13-1234789 HeptaCDF **	%	104							5803161
C13-123678 HexaCDD *	%	70							5803161
C13-123678 HexaCDF **	%	81							5803161
C13-12378 PentaCDD *	%	103							5803161
C13-12378 PentaCDF **	%	94							5803161
C13-123789 HexaCDF **	%	70							5803161
C13-23478 PentaCDF **	%	114							5803161
C13-2378 TetraCDD *	%	104							5803161
C13-2378 TetraCDF **	%	81							5803161
C13-OCDD *	%	80							5803161
Cl37-2378 TetraCDD *	%	77							5803161

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (AIR)

Maxxam ID		HYO565							
Sampling Date		2018/10/04							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	**PUF-BEACH-OCTOBER 04 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	ND	3.1	30	6.0	1.00	3.10		5803161
1,2,3,7,8-Penta CDD *	pg	ND	4.1	30	6.0	1.00	4.10		5803161
1,2,3,4,7,8-Hexa CDD *	pg	ND	4.5	30	6.0	0.100	0.450		5803161
1,2,3,6,7,8-Hexa CDD *	pg	ND	4.4	30	6.0	0.100	0.440		5803161
1,2,3,7,8,9-Hexa CDD *	pg	ND	4.4	30	6.0	0.100	0.440		5803161
1,2,3,4,6,7,8-Hepta CDD *	pg	ND	3.8	30	9.0	0.0100	0.0380		5803161
Octa CDD *	pg	ND (1)	11	300	9.0	0.000300	0.00330		5803161
Total Tetra CDD *	pg	ND	3.1	30	N/A			0	5803161
Total Penta CDD *	pg	ND	4.1	30	N/A			0	5803161
Total Hexa CDD *	pg	ND	4.5	30	N/A			0	5803161
Total Hepta CDD *	pg	ND	3.8	30	N/A			0	5803161
2,3,7,8-Tetra CDF **	pg	ND	3.8	30	6.0	0.100	0.380		5803161
1,2,3,7,8-Penta CDF **	pg	ND	4.4	30	6.0	0.0300	0.132		5803161
2,3,4,7,8-Penta CDF **	pg	ND	4.4	30	6.0	0.300	1.32		5803161
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.8	30	6.0	0.100	0.380		5803161
1,2,3,6,7,8-Hexa CDF **	pg	ND	3.7	30	6.0	0.100	0.370		5803161
2,3,4,6,7,8-Hexa CDF **	pg	ND	4.3	30	6.0	0.100	0.430		5803161
1,2,3,7,8,9-Hexa CDF **	pg	ND	4.9	30	6.0	0.100	0.490		5803161
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	2.7	30	9.0	0.0100	0.0270		5803161
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	3.8	30	6.0	0.0100	0.0380		5803161
Octa CDF **	pg	ND	4.5	300	15	0.000300	0.00135		5803161
Total Tetra CDF **	pg	ND	3.8	30	N/A			0	5803161
Total Penta CDF **	pg	ND	4.4	30	N/A			0	5803161
Total Hexa CDF **	pg	ND	4.1	30	N/A			0	5803161
Total Hepta CDF **	pg	ND	3.1	30	N/A			0	5803161

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

ND = Not detected

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

DIOXINS AND FURANS BY HRMS (AIR)

Maxxam ID		HYO565							
Sampling Date		2018/10/04							
COC Number		na				**TOXIC EQUIVALENCY**		# of	
	UNITS	**PUF-BEACH-OCTOBER 04 (2 SAMPLES)**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Toxic Equivalency	pg	ND	3.8	N/A	N/A				5803161
TOTAL TOXIC EQUIVALENCY	pg						12.1		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	85							5803161
C13-1234678 HeptaCDF **	%	80							5803161
C13-123478 HexaCDD *	%	116							5803161
C13-123478 HexaCDF **	%	88							5803161
C13-1234789 HeptaCDF **	%	102							5803161
C13-123678 HexaCDD *	%	70							5803161
C13-123678 HexaCDF **	%	77							5803161
C13-12378 PentaCDD *	%	126							5803161
C13-12378 PentaCDF **	%	110							5803161
C13-123789 HexaCDF **	%	70							5803161
C13-23478 PentaCDF **	%	120							5803161
C13-2378 TetraCDD *	%	104							5803161
C13-2378 TetraCDF **	%	80							5803161
C13-OCDD *	%	80							5803161
Cl37-2378 TetraCDD *	%	77							5803161

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

TEST SUMMARY

Maxxam ID: HYO557 **Collected:** 2018/10/02
Sample ID: PUF-OPG-OCTOBER 02 (2 SAMPLES) **Shipped:**
Matrix: Air **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5803161	2018/10/09	2018/10/25	Angel Guerrero
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5805552	2018/10/09	2018/10/29	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5773444	2018/10/09	2018/10/16	Fan (Carrie) Jiang

Maxxam ID: HYO558 **Collected:** 2018/10/02
Sample ID: PUF-COVE-OCTOBER 02 (2 SAMPLES) **Shipped:**
Matrix: Air **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5803161	2018/10/09	2018/10/25	Angel Guerrero
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5805552	2018/10/09	2018/10/29	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5773444	2018/10/09	2018/10/17	Fan (Carrie) Jiang

Maxxam ID: HYO559 **Collected:** 2018/10/02
Sample ID: PUF-BEACH-OCTOBER 02 (2 SAMPLES) **Shipped:**
Matrix: Air **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5803161	2018/10/09	2018/10/25	Angel Guerrero
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5805552	2018/10/09	2018/10/29	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5773444	2018/10/09	2018/10/16	Fan (Carrie) Jiang

Maxxam ID: HYO560 **Collected:** 2018/10/03
Sample ID: PUF-OPG-OCTOBER 03 (2 SAMPLES) **Shipped:**
Matrix: Air **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5803161	2018/10/09	2018/10/25	Angel Guerrero
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5805552	2018/10/09	2018/10/30	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5773444	2018/10/09	2018/10/16	Fan (Carrie) Jiang

Maxxam ID: HYO561 **Collected:** 2018/10/03
Sample ID: PUF-COVE-OCTOBER 03 (2 SAMPLES) **Shipped:**
Matrix: Air **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5803161	2018/10/09	2018/10/25	Angel Guerrero
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5805552	2018/10/09	2018/10/30	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5773444	2018/10/09	2018/10/17	Fan (Carrie) Jiang

Maxxam ID: HYO562 **Collected:** 2018/10/03
Sample ID: PUF-BEACH-OCTOBER 03 (2 SAMPLES) **Shipped:**
Matrix: Air **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5803161	2018/10/09	2018/10/25	Angel Guerrero

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Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

TEST SUMMARY

Maxxam ID: HYO562
Sample ID: PUF-BEACH-OCTOBER 03 (2 SAMPLES)
Matrix: Air

Collected: 2018/10/03
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5805552	2018/10/09	2018/10/30	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5773444	2018/10/09	2018/10/17	Fan (Carrie) Jiang

Maxxam ID: HYO563
Sample ID: PUF-OPG-OCTOBER 04 (2 SAMPLES)
Matrix: Air

Collected: 2018/10/04
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5803161	2018/10/09	2018/10/25	Angel Guerrero
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5805552	2018/10/09	2018/10/30	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5773444	2018/10/09	2018/10/17	Fan (Carrie) Jiang

Maxxam ID: HYO564
Sample ID: PUF-COVE-OCTOBER 04 (2 SAMPLES)
Matrix: Air

Collected: 2018/10/04
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5803161	2018/10/09	2018/10/25	Angel Guerrero
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5805552	2018/10/09	2018/10/30	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5773444	2018/10/09	2018/10/17	Fan (Carrie) Jiang

Maxxam ID: HYO565
Sample ID: PUF-BEACH-OCTOBER 04 (2 SAMPLES)
Matrix: Air

Collected: 2018/10/04
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5803161	2018/10/09	2018/10/26	Angel Guerrero
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5805552	2018/10/09	2018/10/30	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5773444	2018/10/09	2018/10/17	Fan (Carrie) Jiang

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GENERAL COMMENTS

Dibenzo(a,c) anthracene and Picene : These parameters are not accredited for the submitted matrix.

Dibenzo(a,c)anthracene co-elutes with Dibenz(a,h)anthracene. The data reported is the total of the 2 compounds if both are present.

Chrysene co-elutes with Triphenylene. The data reported is the total of the 2 compounds if both are present.

Benzo(b)fluoranthene and Benzo(j)fluoranthene co-elute. The data reported is the total of the 2 compounds if both are present.

Results relate only to the items tested.

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Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5773444	FJI	Spiked Blank	D10-2-Methylnaphthalene	2018/10/16		56	%	50 - 150
			D10-Fluoranthene	2018/10/16		58	%	50 - 150
			D10-Phenanthrene	2018/10/16		58	%	50 - 150
			D12-Benzo(a)anthracene	2018/10/16		70	%	50 - 150
			D12-Benzo(a)pyrene	2018/10/16		66	%	50 - 150
			D12-Benzo(b)fluoranthene	2018/10/16		70	%	50 - 150
			D12-Benzo(ghi)perylene	2018/10/16		72	%	50 - 150
			D12-Benzo(k)fluoranthene	2018/10/16		66	%	50 - 150
			D12-Chrysene	2018/10/16		66	%	50 - 150
			D12-Indeno(1,2,3-cd)pyrene	2018/10/16		68	%	50 - 150
			D12-Perylene	2018/10/16		64	%	50 - 150
			D14-Dibenzo(a,h)anthracene	2018/10/16		68	%	50 - 150
			D8-Acenaphthylene	2018/10/16		56	%	50 - 150
			D8-Naphthalene	2018/10/16		54	%	50 - 150
			Acenaphthene	2018/10/16		60	%	60 - 130
			Acenaphthylene	2018/10/16		58 (1)	%	60 - 130
			Anthracene	2018/10/16		58 (1)	%	60 - 130
			Benzo(a)anthracene	2018/10/16		70	%	60 - 130
			Benzo(b)fluoranthene	2018/10/16		75	%	60 - 130
			Benzo(g,h,i)perylene	2018/10/16		75	%	60 - 130
			Benzo(k)fluoranthene	2018/10/16		68	%	60 - 130
			Chrysene	2018/10/16		73	%	60 - 130
			Dibenz(a,h)anthracene	2018/10/16		75	%	60 - 130
			Fluoranthene	2018/10/16		60	%	60 - 130
			Fluorene	2018/10/16		60	%	60 - 130
			Indeno(1,2,3-cd)pyrene	2018/10/16		73	%	60 - 130
			Naphthalene	2018/10/16		60	%	60 - 130
			Phenanthrene	2018/10/16		63	%	60 - 130
			Pyrene	2018/10/16		60	%	60 - 130
5773444	FJI	RPD	Acenaphthene	2018/10/16	0		%	50
			Acenaphthylene	2018/10/16	0		%	50
			Anthracene	2018/10/16	0		%	50
			Benzo(a)anthracene	2018/10/16	6.9		%	50
			Benzo(b)fluoranthene	2018/10/16	0		%	50
			Benzo(g,h,i)perylene	2018/10/16	6.5		%	50
			Benzo(k)fluoranthene	2018/10/16	3.6		%	50
			Chrysene	2018/10/16	6.7		%	50
			Dibenz(a,h)anthracene	2018/10/16	18		%	50
			Fluoranthene	2018/10/16	0		%	50
			Fluorene	2018/10/16	0		%	50
			Indeno(1,2,3-cd)pyrene	2018/10/16	16		%	50
			Naphthalene	2018/10/16	4.1		%	50
			Phenanthrene	2018/10/16	0		%	50
			Pyrene	2018/10/16	0		%	50
5773444	FJI	Method Blank	D10-2-Methylnaphthalene	2018/10/16		60	%	50 - 150
			D10-Fluoranthene	2018/10/16		56	%	50 - 150
			D10-Phenanthrene	2018/10/16		60	%	50 - 150
			D12-Benzo(a)anthracene	2018/10/16		66	%	50 - 150
			D12-Benzo(a)pyrene	2018/10/16		62	%	50 - 150
			D12-Benzo(b)fluoranthene	2018/10/16		68	%	50 - 150
			D12-Benzo(ghi)perylene	2018/10/16		76	%	50 - 150
			D12-Benzo(k)fluoranthene	2018/10/16		68	%	50 - 150
			D12-Chrysene	2018/10/16		64	%	50 - 150

Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			D12-Indeno(1,2,3-cd)pyrene	2018/10/16		68	%	50 - 150
			D12-Perylene	2018/10/16		60	%	50 - 150
			D14-Dibenzo(a,h)anthracene	2018/10/16		68	%	50 - 150
			D8-Acenaphthylene	2018/10/16		56	%	50 - 150
			D8-Naphthalene	2018/10/16		58	%	50 - 150
			1-Methylnaphthalene	2018/10/16	ND, RDL=0.15		ug	
			1-Methylphenanthrene	2018/10/16	ND, RDL=0.15		ug	
			2-Chloronaphthalene	2018/10/16	ND, RDL=0.15		ug	
			2-Methylanthracene	2018/10/16	ND, RDL=0.15		ug	
			2-Methylnaphthalene	2018/10/16	ND, RDL=0.15		ug	
			3-Methylcholanthrene	2018/10/16	ND, RDL=3.0		ug	
			7,12-Dimethylbenzo(a)anthracene	2018/10/16	ND, RDL=0.60		ug	
			9,10-Dimethylanthracene	2018/10/16	ND, RDL=0.60		ug	
			Acenaphthene	2018/10/16	ND, RDL=0.075		ug	
			Acenaphthylene	2018/10/16	ND, RDL=0.075		ug	
			Anthracene	2018/10/16	ND, RDL=0.075		ug	
			Benzo(a)anthracene	2018/10/16	ND, RDL=0.075		ug	
			Benzo(a)fluorene	2018/10/16	ND, RDL=0.15		ug	
			Benzo(b)fluoranthene	2018/10/16	ND, RDL=0.075		ug	
			Benzo(b)fluorene	2018/10/16	ND, RDL=0.15		ug	
			Benzo(e)pyrene	2018/10/16	ND, RDL=0.15		ug	
			Benzo(g,h,i)perylene	2018/10/16	ND, RDL=0.075		ug	
			Benzo(k)fluoranthene	2018/10/16	ND, RDL=0.075		ug	
			Chrysene	2018/10/16	ND, RDL=0.075		ug	
			Coronene	2018/10/16	ND, RDL=0.15		ug	
			Dibenz(a,h)anthracene	2018/10/16	ND, RDL=0.075		ug	
			Dibenzo(a,c) anthracene + Picene	2018/10/16	ND, RDL=0.15		ug	
			Dibenzo(a,c)anthracene	2018/10/16	ND, RDL=0.15		ug	
			Dibenzo(a,e)pyrene	2018/10/16	ND, RDL=0.30		ug	

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Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Fluoranthene	2018/10/16	ND, RDL=0.075		ug	
			Fluorene	2018/10/16	ND, RDL=0.075		ug	
			Indeno(1,2,3-cd)pyrene	2018/10/16	ND, RDL=0.075		ug	
			Naphthalene	2018/10/16	ND, RDL=0.11		ug	
			Perylene	2018/10/16	ND, RDL=0.15		ug	
			Phenanthrene	2018/10/16	ND, RDL=0.075		ug	
			Picene	2018/10/16	ND, RDL=0.15		ug	
			Pyrene	2018/10/16	ND, RDL=0.075		ug	
			Tetralin	2018/10/16	ND, RDL=0.15		ug	
5803161	AGU	Spiked Blank	C13-1234678 HeptaCDD	2018/10/26		84	%	25 - 130
			C13-1234678 HeptaCDF	2018/10/26		80	%	25 - 130
			C13-123678 HexaCDD	2018/10/26		69	%	40 - 130
			C13-123678 HexaCDF	2018/10/26		78	%	40 - 130
			C13-12378 PentaCDD	2018/10/26		120	%	40 - 130
			C13-12378 PentaCDF	2018/10/26		107	%	40 - 130
			C13-123789 HexaCDF	2018/10/26		69 (2)	%	70 - 130
			C13-2378 TetraCDD	2018/10/26		104	%	40 - 130
			C13-2378 TetraCDF	2018/10/26		80	%	40 - 130
			C13-OCDD	2018/10/26		83	%	25 - 130
			2,3,7,8-Tetra CDD	2018/10/26		116	%	80 - 140
			1,2,3,7,8-Penta CDD	2018/10/26		114	%	80 - 140
			1,2,3,4,7,8-Hexa CDD	2018/10/26		115	%	80 - 140
			1,2,3,6,7,8-Hexa CDD	2018/10/26		120	%	80 - 140
			1,2,3,7,8,9-Hexa CDD	2018/10/26		115	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDD	2018/10/26		119	%	80 - 140
			Octa CDD	2018/10/26		111	%	80 - 140
			2,3,7,8-Tetra CDF	2018/10/26		109	%	80 - 140
			1,2,3,7,8-Penta CDF	2018/10/26		117	%	80 - 140
			2,3,4,7,8-Penta CDF	2018/10/26		126	%	80 - 140
			1,2,3,4,7,8-Hexa CDF	2018/10/26		117	%	80 - 140
			1,2,3,6,7,8-Hexa CDF	2018/10/26		122	%	80 - 140
			2,3,4,6,7,8-Hexa CDF	2018/10/26		112	%	80 - 140
			1,2,3,7,8,9-Hexa CDF	2018/10/26		110	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDF	2018/10/26		118	%	80 - 140
			1,2,3,4,7,8,9-Hepta CDF	2018/10/26		112	%	80 - 140
			Octa CDF	2018/10/26		113	%	80 - 140
5803161	AGU	RPD	2,3,7,8-Tetra CDD	2018/10/26	0		%	20
			1,2,3,7,8-Penta CDD	2018/10/26	0		%	20
			1,2,3,4,7,8-Hexa CDD	2018/10/26	5.1		%	20
			1,2,3,6,7,8-Hexa CDD	2018/10/26	3.4		%	20
			1,2,3,7,8,9-Hexa CDD	2018/10/26	0.87		%	20
			1,2,3,4,6,7,8-Hepta CDD	2018/10/26	0		%	20
			Octa CDD	2018/10/26	0		%	20
			2,3,7,8-Tetra CDF	2018/10/26	0.91		%	20

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Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8-Penta CDF	2018/10/26	1.7		%	20
			2,3,4,7,8-Penta CDF	2018/10/26	7.6		%	20
			1,2,3,4,7,8-Hexa CDF	2018/10/26	1.7		%	20
			1,2,3,6,7,8-Hexa CDF	2018/10/26	2.5		%	20
			2,3,4,6,7,8-Hexa CDF	2018/10/26	2.6		%	20
			1,2,3,7,8,9-Hexa CDF	2018/10/26	0		%	20
			1,2,3,4,6,7,8-Hepta CDF	2018/10/26	1.7		%	20
			1,2,3,4,7,8,9-Hepta CDF	2018/10/26	3.6		%	20
			Octa CDF	2018/10/26	0		%	20
5803161	AGU	Method Blank	C13-1234678 HeptaCDD	2018/10/25		95	%	25 - 130
			C13-1234678 HeptaCDF	2018/10/25		91	%	25 - 130
			C13-123678 HexaCDD	2018/10/25		74	%	40 - 130
			C13-123678 HexaCDF	2018/10/25		88	%	40 - 130
			C13-12378 PentaCDD	2018/10/25		106	%	40 - 130
			C13-12378 PentaCDF	2018/10/25		100	%	40 - 130
			C13-123789 HexaCDF	2018/10/25		73	%	70 - 130
			C13-2378 TetraCDD	2018/10/25		104	%	40 - 130
			C13-2378 TetraCDF	2018/10/25		81	%	40 - 130
			C13-OCDD	2018/10/25		89	%	25 - 130
			2,3,7,8-Tetra CDD	2018/10/25	ND, EDL=3.7		pg	
			1,2,3,7,8-Penta CDD	2018/10/25	ND, EDL=3.5		pg	
			1,2,3,4,7,8-Hexa CDD	2018/10/25	ND, EDL=4.2		pg	
			1,2,3,6,7,8-Hexa CDD	2018/10/25	ND, EDL=4.1		pg	
			1,2,3,7,8,9-Hexa CDD	2018/10/25	ND, EDL=4.0		pg	
			1,2,3,4,6,7,8-Hepta CDD	2018/10/25	ND, EDL=3.2		pg	
			Octa CDD	2018/10/25	ND, EDL=4.3		pg	
			Total Tetra CDD	2018/10/25	ND, EDL=3.7		pg	
			Total Penta CDD	2018/10/25	ND, EDL=3.5		pg	
			Total Hexa CDD	2018/10/25	ND, EDL=4.1		pg	
			Total Hepta CDD	2018/10/25	ND, EDL=3.2		pg	
			2,3,7,8-Tetra CDF	2018/10/25	ND, EDL=3.5		pg	
			1,2,3,7,8-Penta CDF	2018/10/25	ND, EDL=3.3		pg	
			2,3,4,7,8-Penta CDF	2018/10/25	ND, EDL=3.3		pg	
			1,2,3,4,7,8-Hexa CDF	2018/10/25	ND, EDL=3.4		pg	
			1,2,3,6,7,8-Hexa CDF	2018/10/25	ND, EDL=3.3		pg	
			2,3,4,6,7,8-Hexa CDF	2018/10/25	ND, EDL=3.8		pg	

Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8,9-Hexa CDF	2018/10/25	ND, EDL=4.4		pg	
			1,2,3,4,6,7,8-Hepta CDF	2018/10/25	ND, EDL=1.9		pg	
			1,2,3,4,7,8,9-Hepta CDF	2018/10/25	ND, EDL=2.8		pg	
			Octa CDF	2018/10/25	ND, EDL=4.0		pg	
			Total Tetra CDF	2018/10/25	ND, EDL=3.5		pg	
			Total Penta CDF	2018/10/25	ND, EDL=3.3		pg	
			Total Hexa CDF	2018/10/25	ND, EDL=3.7		pg	
			Total Hepta CDF	2018/10/25	ND, EDL=2.3		pg	
			Toxic Equivalency	2018/10/25	ND, EDL=3.5		pg	
5805552	BY	Spiked Blank	Benzo(a)pyrene (13C4)	2018/10/30		91	%	50 - 150
			Benzo(a)pyrene	2018/10/30		112	%	60 - 140
5805552	BY	RPD	Benzo(a)pyrene	2018/10/30	3.6		%	50
5805552	BY	Method Blank	Benzo(a)pyrene (13C4)	2018/10/29		101	%	50 - 150
			Benzo(a)pyrene	2018/10/29	ND, RDL=0.030		ug	

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) Recovery outside method acceptance criteria.Minimal impact on data

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B8Q4511
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

CHARTERED
Rodney A. Major
CHEMIST

Rodney Major, Manager Organic Processing Lab

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Chain of Custody Form - AIR

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Phone: (905) 817-5700
Fax: (905) 817-5777

CAM FCD-01302 /2 Page ____ of ____

ANALYSIS REQUESTED

CLIENT INFORMATION SECTION

Company Name: RWDI
Project Manager: Kirk Easto
e-mail: kirk.easto@rwdi.com
Address: 600 Southgate Dr. Gielph, ON
Phone: (519) 823-1311 Fax:
Sampled by: JDF

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time	PUF - Dioxins and Furans + PAH's (see list)
PUF - OPG - October 02 (2 samples)		8 CFM	2018/10/02	24 hrs	x
PUF - Cove - October 02 (2 samples)		8 CFM	2018/10/02	24 hrs	x
PUF - Beach - October 02 (2 samples)		8 CFM	2018/10/02	24 hrs	x
PUF - OPG - October 03 (2 samples)		8 CFM	2018/10/03	24 hrs	x
PUF - Cove - October 03 (2 samples)		8 CFM	2018/10/03	24 hrs	x
PUF - Beach - October 03 (2 samples)		8 CFM	1900/01/03	24 hrs	x
PUF - OPG - October 04 (2 samples)		8 CFM	2018/10/04	24 hrs	x
PUF - Cove - October 04 (2 samples)		8 CFM	2018/10/04	24 hrs	x
PUF - Beach - October 04 (2 samples)		8 CFM	2018/10/04	24 hrs	x

06-Oct-18 10:40
Clayton Johnson
B8Q4511
DSG AIR-FRIDGE

TAT Requirement

STD 10 Business day ☑
Rush 5 Business day * ☐
Rush 2 Business day * ☐
* need approval from Maxxam

PROJECT INFORMATION

Project #: 1804600
Name: St Marys Ambient
PO #: 1804600
Maxxam Quote #:
Maxxam Contact:

REPORTING REQUIREMENTS

Summary Report only ☐
EDD ☐
Regulation

Notes

Please note if this samples are "Industrial Hygiene" samples

PROJECT SPECIFIC COMMENTS

See parameter list from Kirk Easto

Client Signature: Joe Frost
Affiliation: Env Tech
Date/Time: 2018/10/05

Received by: Pareep / Pareep Khureed
Affiliation: Maxxam
Date/Time: 2018/10/06 10:40

14/14/14 ON Ice pack.

Your P.O. #: 1702401
Your Project #: 1702401
Site Location: ST MARYS AMB
Your C.O.C. #: N/A

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2019/01/15
Report #: R5557669
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B8P8717
Received: 2018/10/02, 12:09

Sample Matrix: PUF AND FILTER
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Dioxins/Furans in Ambient Air (TO-9)	6	2018/10/06	2018/10/19	BRL SOP-00411	EPA TO-9 m
PAHs in Ambient Air Samples by HRMS	6	2018/10/06	2018/10/29	BRL SOP-00418	CARB429 m
PAH's in Air (CARB429mod)	6	2018/10/06	2018/10/19	BRL SOP-00201	CARB429/ARBM1/M2 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

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Your P.O. #: 1702401
Your Project #: 1702401
Site Location: ST MARYS AMB
Your C.O.C. #: N/A

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2019/01/15
Report #: R5557669
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B8P8717
Received: 2018/10/02, 12:09

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769
==
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Maxxam Job #: B8P8717
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1702401
Site Location: ST MARYS AMB
Your P.O. #: 1702401
Sampler Initials: JDF

RESULTS OF ANALYSES OF PUF AND FILTER

Maxxam ID		HXI019		HXI020		HXI021				
Sampling Date		2018/09/30		2018/09/30		2018/09/30				
COC Number		N/A		N/A		N/A				
	UNITS	**OPG-09/30/18**	**EDL**	**COVE-09/30/18**	**EDL**	**BEACH-09/30/18**	**EDL**	**RDL**	**MDL**	**QC Batch**
Benzo(a)pyrene	ug	0.0128	0.00084	0.0122	0.00087	0.0159	0.00081	0.030	N/A	5805551
Surrogate Recovery (%)										
Benzo(a)pyrene (13C4)	%	92 (1)		75 (1)		95 (1)				5805551

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Benzo(a)pyrene-2H12 used in analysis.

Maxxam ID		HXI022		HXI023		HXI024				
Sampling Date		2018/10/01		2018/10/01		2018/10/01				
COC Number		N/A		N/A		N/A				
	UNITS	**OPG-10/01/18**	**EDL**	**COVE-10/01/18**	**EDL**	**BEACH-10/01/18**	**EDL**	**RDL**	**MDL**	**QC Batch**
Benzo(a)pyrene	ug	0.00545	0.00086	0.00872	0.00065	0.00588	0.00058	0.030	N/A	5805551
Surrogate Recovery (%)										
Benzo(a)pyrene (13C4)	%	87 (1)		98 (1)		97 (1)				5805551

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Benzo(a)pyrene-2H12 used in analysis.

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Maxxam Job #: B8P8717
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1702401
Site Location: ST MARYS AMB
Your P.O. #: 1702401
Sampler Initials: JDF

SEMI-VOLATILE ORGANICS BY GC-MS (PUF AND FILTER)

Maxxam ID		HXI019	HXI020	HXI021	HXI022			
Sampling Date		2018/09/30	2018/09/30	2018/09/30	2018/10/01			
COC Number		N/A	N/A	N/A	N/A			
	UNITS	**OPG-09/30/18**	**COVE-09/30/18**	**BEACH-09/30/18**	**OPG-10/01/18**	**RDL**	**MDL**	**QC Batch**
1-Methylnaphthalene	ug	0.90	0.69	0.84	0.48	0.15	0.030	5771413
1-Methylphenanthrene	ug	ND	ND	ND	ND	0.15	0.030	5771413
2-Chloronaphthalene	ug	ND	ND	ND	ND	0.15	0.030	5771413
2-Methylanthracene	ug	ND	ND	ND	ND	0.15	0.030	5771413
2-Methylnaphthalene	ug	1.44	1.05	1.26	0.78	0.15	0.030	5771413
3-Methylcholanthrene	ug	ND	ND	ND	ND	3.0	0.60	5771413
7,12-Dimethylbenzo(a)anthracene	ug	ND	ND	ND	ND	0.60	N/A	5771413
9,10-Dimethylanthracene	ug	ND	ND	ND	ND	0.60	0.12	5771413
Acenaphthene	ug	0.150	0.330	0.300	0.120	0.075	0.030	5771413
Acenaphthylene	ug	ND	ND	ND	ND	0.075	0.030	5771413
Anthracene	ug	ND	ND	ND	ND	0.075	0.030	5771413
Benzo(a)anthracene	ug	ND	ND	ND	ND	0.075	0.030	5771413
Benzo(a)fluorene	ug	ND	ND	ND	ND	0.15	0.030	5771413
Benzo(b)fluoranthene	ug	ND	ND	ND	ND	0.075	0.030	5771413
Benzo(b)fluorene	ug	ND	ND	ND	ND	0.15	0.030	5771413
Benzo(e)pyrene	ug	ND	ND	ND	ND	0.15	0.030	5771413
Benzo(g,h,i)perylene	ug	ND	ND	ND	ND	0.075	0.030	5771413
Benzo(k)fluoranthene	ug	ND	ND	ND	ND	0.075	0.030	5771413
Chrysene	ug	ND	ND	ND	ND	0.075	0.030	5771413
Coronene	ug	ND	ND	ND	ND	0.15	0.030	5771413
Dibenz(a,h)anthracene	ug	ND	ND	ND	ND	0.075	0.030	5771413
Dibenzo(a,c) anthracene + Picene	ug	ND	ND	ND	ND	0.15	0.030	5771413
Dibenzo(a,c)anthracene	ug	ND	ND	ND	ND	0.15	0.030	5771413
Dibenzo(a,e)pyrene	ug	ND	ND	ND	ND	0.30	0.060	5771413
Fluoranthene	ug	0.120	0.120	0.240	0.120	0.075	0.030	5771413
Fluorene	ug	0.300	0.360	0.390	0.150	0.075	0.030	5771413
Indeno(1,2,3-cd)pyrene	ug	ND	ND	ND	ND	0.075	0.030	5771413
Naphthalene	ug	5.37	4.29	4.98	2.22	0.11	0.031	5771413
Perylene	ug	ND	ND	ND	ND	0.15	0.030	5771413
Phenanthrene	ug	0.540	0.630	0.960	0.420	0.075	0.030	5771413
Picene	ug	ND	ND	ND	ND	0.15	0.030	5771413
Pyrene	ug	ND	0.090	0.150	0.090	0.075	0.030	5771413
Tetralin	ug	0.39	0.30	0.42	0.24	0.15	0.030	5771413

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

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Maxxam Job #: B8P8717
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1702401
Site Location: ST MARYS AMB
Your P.O. #: 1702401
Sampler Initials: JDF

SEMI-VOLATILE ORGANICS BY GC-MS (PUF AND FILTER)

Maxxam ID		HXI019	HXI020	HXI021	HXI022			
Sampling Date		2018/09/30	2018/09/30	2018/09/30	2018/10/01			
COC Number		N/A	N/A	N/A	N/A			
	UNITS	**OPG-09/30/18**	**COVE-09/30/18**	**BEACH-09/30/18**	**OPG-10/01/18**	**RDL**	**MDL**	**QC Batch**
Surrogate Recovery (%)								
D10-2-Methylnaphthalene	%	64	62	64	62			5771413
D10-Fluoranthene	%	70	66	72	66			5771413
D10-Fluorene (FS)	%	62	58	64	44 (1)			5771413
D10-Phenanthrene	%	68	64	68	64			5771413
D12-Benzo(a)anthracene	%	82	82	84	82			5771413
D12-Benzo(a)pyrene	%	74	72	76	74			5771413
D12-Benzo(b)fluoranthene	%	84	80	84	80			5771413
D12-Benzo(ghi)perylene	%	74	72	76	74			5771413
D12-Benzo(k)fluoranthene	%	76	76	78	78			5771413
D12-Chrysene	%	80	80	82	80			5771413
D12-Indeno(1,2,3-cd)pyrene	%	72	72	74	72			5771413
D12-Perylene	%	74	72	74	74			5771413
D14-Dibenzo(a,h)anthracene	%	74	72	76	74			5771413
D14-Terphenyl (FS)	%	68	64	72	66			5771413
D8-Acenaphthylene	%	66	62	66	62			5771413
D8-Naphthalene	%	60	60	60	60			5771413

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Maxxam Job #: B8P8717
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SEMI-VOLATILE ORGANICS BY GC-MS (PUF AND FILTER)

Maxxam ID		HXI023	HXI024			
Sampling Date		2018/10/01	2018/10/01			
COC Number		N/A	N/A			
	UNITS	**COVE-10/01/18**	**BEACH-10/01/18**	**RDL**	**MDL**	**QC Batch**
1-Methylnaphthalene	ug	0.36	0.24	0.15	0.030	5771413
1-Methylphenanthrene	ug	ND	ND	0.15	0.030	5771413
2-Chloronaphthalene	ug	ND	ND	0.15	0.030	5771413
2-Methylanthracene	ug	ND	ND	0.15	0.030	5771413
2-Methylnaphthalene	ug	0.57	0.42	0.15	0.030	5771413
3-Methylcholanthrene	ug	ND	ND	3.0	0.60	5771413
7,12-Dimethylbenzo(a)anthracene	ug	ND	ND	0.60	N/A	5771413
9,10-Dimethylanthracene	ug	ND	ND	0.60	0.12	5771413
Acenaphthene	ug	0.210	0.180	0.075	0.030	5771413
Acenaphthylene	ug	ND	ND	0.075	0.030	5771413
Anthracene	ug	ND	ND	0.075	0.030	5771413
Benzo(a)anthracene	ug	ND	ND	0.075	0.030	5771413
Benzo(a)fluorene	ug	ND	ND	0.15	0.030	5771413
Benzo(b)fluoranthene	ug	ND	ND	0.075	0.030	5771413
Benzo(b)fluorene	ug	ND	ND	0.15	0.030	5771413
Benzo(e)pyrene	ug	ND	ND	0.15	0.030	5771413
Benzo(g,h,i)perylene	ug	ND	ND	0.075	0.030	5771413
Benzo(k)fluoranthene	ug	ND	ND	0.075	0.030	5771413
Chrysene	ug	ND	ND	0.075	0.030	5771413
Coronene	ug	ND	ND	0.15	0.030	5771413
Dibenz(a,h)anthracene	ug	ND	ND	0.075	0.030	5771413
Dibenzo(a,c) anthracene + Picene	ug	ND	ND	0.15	0.030	5771413
Dibenzo(a,c)anthracene	ug	ND	ND	0.15	0.030	5771413
Dibenzo(a,e)pyrene	ug	ND	ND	0.30	0.060	5771413
Fluoranthene	ug	0.270	0.210	0.075	0.030	5771413
Fluorene	ug	0.390	0.270	0.075	0.030	5771413
Indeno(1,2,3-cd)pyrene	ug	ND	ND	0.075	0.030	5771413
Naphthalene	ug	1.62	1.08	0.11	0.031	5771413
Perylene	ug	ND	ND	0.15	0.030	5771413
Phenanthrene	ug	0.930	0.960	0.075	0.030	5771413
Picene	ug	ND	ND	0.15	0.030	5771413
Pyrene	ug	0.180	0.150	0.075	0.030	5771413
Tetralin	ug	0.21	0.18	0.15	0.030	5771413

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
N/A = Not Applicable

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SEMI-VOLATILE ORGANICS BY GC-MS (PUF AND FILTER)

Maxxam ID		HXI023	HXI024			
Sampling Date		2018/10/01	2018/10/01			
COC Number		N/A	N/A			
	UNITS	**COVE-10/01/18**	**BEACH-10/01/18**	**RDL**	**MDL**	**QC Batch**
Surrogate Recovery (%)						
D10-2-Methylnaphthalene	%	60	60			5771413
D10-Fluoranthene	%	68	70			5771413
D10-Fluorene (FS)	%	58	62			5771413
D10-Phenanthrene	%	64	66			5771413
D12-Benzo(a)anthracene	%	82	84			5771413
D12-Benzo(a)pyrene	%	72	76			5771413
D12-Benzo(b)fluoranthene	%	80	82			5771413
D12-Benzo(ghi)perylene	%	70	72			5771413
D12-Benzo(k)fluoranthene	%	76	78			5771413
D12-Chrysene	%	80	84			5771413
D12-Indeno(1,2,3-cd)pyrene	%	68	72			5771413
D12-Perylene	%	72	76			5771413
D14-Dibenzo(a,h)anthracene	%	68	72			5771413
D14-Terphenyl (FS)	%	66	70			5771413
D8-Acenaphthylene	%	62	64			5771413
D8-Naphthalene	%	56	60			5771413

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8P8717
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1702401
Site Location: ST MARYS AMB
Your P.O. #: 1702401
Sampler Initials: JDF

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		HXI019							
Sampling Date		2018/09/30							
COC Number		N/A				TOXIC EQUIVALENCY		# of	
	UNITS	OPG-09/30/18	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	ND	4.3	30	6.0	1.00	4.30		5808970
1,2,3,7,8-Penta CDD *	pg	ND	4.1	30	6.0	1.00	4.10		5808970
1,2,3,4,7,8-Hexa CDD *	pg	ND	4.3	30	6.0	0.100	0.430		5808970
1,2,3,6,7,8-Hexa CDD *	pg	ND	4.2	30	6.0	0.100	0.420		5808970
1,2,3,7,8,9-Hexa CDD *	pg	ND	4.2	30	6.0	0.100	0.420		5808970
1,2,3,4,6,7,8-Hepta CDD *	pg	32.6	4.0	30	9.0	0.0100	0.326		5808970
Octa CDD *	pg	79.3	5.3	300	9.0	0.000300	0.0238		5808970
Total Tetra CDD *	pg	ND	4.3	30	N/A			0	5808970
Total Penta CDD *	pg	ND	4.1	30	N/A			0	5808970
Total Hexa CDD *	pg	ND	7.0	30	N/A			0	5808970
Total Hepta CDD *	pg	70.4	4.0	30	N/A			2	5808970
2,3,7,8-Tetra CDF **	pg	ND	3.9	30	6.0	0.100	0.390		5808970
1,2,3,7,8-Penta CDF **	pg	ND	3.9	30	6.0	0.0300	0.117		5808970
2,3,4,7,8-Penta CDF **	pg	ND	3.9	30	6.0	0.300	1.17		5808970
1,2,3,4,7,8-Hexa CDF **	pg	ND	4.0	30	6.0	0.100	0.400		5808970
1,2,3,6,7,8-Hexa CDF **	pg	ND	3.9	30	6.0	0.100	0.390		5808970
2,3,4,6,7,8-Hexa CDF **	pg	ND	4.5	30	6.0	0.100	0.450		5808970
1,2,3,7,8,9-Hexa CDF **	pg	ND	5.1	30	6.0	0.100	0.510		5808970
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	3.3	30	9.0	0.0100	0.0330		5808970
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	4.7	30	6.0	0.0100	0.0470		5808970
Octa CDF **	pg	ND	5.3	300	15	0.000300	0.00159		5808970
Total Tetra CDF **	pg	ND	3.9	30	N/A			0	5808970
Total Penta CDF **	pg	ND	3.9	30	N/A			0	5808970
Total Hexa CDF **	pg	ND	4.3	30	N/A			0	5808970
Total Hepta CDF **	pg	ND	3.9	30	N/A			0	5808970
Toxic Equivalency	pg	ND	3.9	N/A	N/A				5808970

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8P8717
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1702401
Site Location: ST MARYS AMB
Your P.O. #: 1702401
Sampler Initials: JDF

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		HXI019							
Sampling Date		2018/09/30							
COC Number		N/A				**TOXIC EQUIVALENCY**		# of	
	UNITS	**OPG-09/30/18**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
TOTAL TOXIC EQUIVALENCY	pg						13.5		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	82							5808970
C13-1234678 HeptaCDF **	%	82							5808970
C13-123478 HexaCDD *	%	118							5808970
C13-123478 HexaCDF **	%	85							5808970
C13-1234789 HeptaCDF **	%	89							5808970
C13-123678 HexaCDD *	%	85							5808970
C13-123678 HexaCDF **	%	78							5808970
C13-12378 PentaCDD *	%	81							5808970
C13-12378 PentaCDF **	%	87							5808970
C13-123789 HexaCDF **	%	80							5808970
C13-23478 PentaCDF **	%	106							5808970
C13-2378 TetraCDD *	%	115							5808970
C13-2378 TetraCDF **	%	105							5808970
C13-OCDD *	%	71							5808970
Cl37-2378 TetraCDD *	%	79							5808970

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

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DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		HXI020							
Sampling Date		2018/09/30							
COC Number		N/A				TOXIC EQUIVALENCY		# of	
	UNITS	**COVE-09/30/18**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	ND	4.2	30	6.0	1.00	4.20		5808970
1,2,3,7,8-Penta CDD *	pg	ND	4.3	30	6.0	1.00	4.30		5808970
1,2,3,4,7,8-Hexa CDD *	pg	ND	4.6	30	6.0	0.100	0.460		5808970
1,2,3,6,7,8-Hexa CDD *	pg	ND	4.5	30	6.0	0.100	0.450		5808970
1,2,3,7,8,9-Hexa CDD *	pg	ND	4.4	30	6.0	0.100	0.440		5808970
1,2,3,4,6,7,8-Hepta CDD *	pg	20.2	4.3	30	9.0	0.0100	0.202		5808970
Octa CDD *	pg	58.2	4.8	300	9.0	0.000300	0.0175		5808970
Total Tetra CDD *	pg	ND	4.2	30	N/A			0	5808970
Total Penta CDD *	pg	ND	4.3	30	N/A			0	5808970
Total Hexa CDD *	pg	ND	5.0	30	N/A			0	5808970
Total Hepta CDD *	pg	43.0	4.3	30	N/A			2	5808970
2,3,7,8-Tetra CDF **	pg	ND	4.3	30	6.0	0.100	0.430		5808970
1,2,3,7,8-Penta CDF **	pg	ND	3.7	30	6.0	0.0300	0.111		5808970
2,3,4,7,8-Penta CDF **	pg	ND	3.7	30	6.0	0.300	1.11		5808970
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.2	30	6.0	0.100	0.320		5808970
1,2,3,6,7,8-Hexa CDF **	pg	ND	3.1	30	6.0	0.100	0.310		5808970
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.6	30	6.0	0.100	0.360		5808970
1,2,3,7,8,9-Hexa CDF **	pg	ND	4.2	30	6.0	0.100	0.420		5808970
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	3.5	30	9.0	0.0100	0.0350		5808970
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	5.1	30	6.0	0.0100	0.0510		5808970
Octa CDF **	pg	ND	3.5	300	15	0.000300	0.00105		5808970
Total Tetra CDF **	pg	ND	4.3	30	N/A			0	5808970
Total Penta CDF **	pg	ND	3.7	30	N/A			0	5808970
Total Hexa CDF **	pg	ND	3.5	30	N/A			0	5808970
Total Hepta CDF **	pg	ND	4.2	30	N/A			0	5808970
Toxic Equivalency	pg	6.1	4.3	N/A	N/A				5808970

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan

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RWDI Air Inc
Client Project #: 1702401
Site Location: ST MARYS AMB
Your P.O. #: 1702401
Sampler Initials: JDF

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		HXI020							
Sampling Date		2018/09/30							
COC Number		N/A				**TOXIC EQUIVALENCY**		# of	
	UNITS	**COVE-09/30/18**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
TOTAL TOXIC EQUIVALENCY	pg						13.2		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	105							5808970
C13-1234678 HeptaCDF **	%	94							5808970
C13-123478 HexaCDD *	%	120							5808970
C13-123478 HexaCDF **	%	86							5808970
C13-1234789 HeptaCDF **	%	102							5808970
C13-123678 HexaCDD *	%	90							5808970
C13-123678 HexaCDF **	%	102							5808970
C13-12378 PentaCDD *	%	71							5808970
C13-12378 PentaCDF **	%	76							5808970
C13-123789 HexaCDF **	%	77							5808970
C13-23478 PentaCDF **	%	102							5808970
C13-2378 TetraCDD *	%	119							5808970
C13-2378 TetraCDF **	%	108							5808970
C13-OCDD *	%	85							5808970
Cl37-2378 TetraCDD *	%	78							5808970

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

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Maxxam Job #: B8P8717
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1702401
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DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		HXI021							
Sampling Date		2018/09/30							
COC Number		N/A				TOXIC EQUIVALENCY		# of	
	UNITS	BEACH-09/30/18	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	ND	3.9	30	6.0	1.00	3.90		5808970
1,2,3,7,8-Penta CDD *	pg	ND	4.1	30	6.0	1.00	4.10		5808970
1,2,3,4,7,8-Hexa CDD *	pg	ND	4.3	30	6.0	0.100	0.430		5808970
1,2,3,6,7,8-Hexa CDD *	pg	ND	4.2	30	6.0	0.100	0.420		5808970
1,2,3,7,8,9-Hexa CDD *	pg	ND	4.1	30	6.0	0.100	0.410		5808970
1,2,3,4,6,7,8-Hepta CDD *	pg	26.4	4.1	30	9.0	0.0100	0.264		5808970
Octa CDD *	pg	74.7	3.5	300	9.0	0.000300	0.0224		5808970
Total Tetra CDD *	pg	ND	3.9	30	N/A			0	5808970
Total Penta CDD *	pg	ND	4.1	30	N/A			0	5808970
Total Hexa CDD *	pg	16.5	4.2	30	N/A			2	5808970
Total Hepta CDD *	pg	55.2	4.1	30	N/A			2	5808970
2,3,7,8-Tetra CDF **	pg	ND	4.4	30	6.0	0.100	0.440		5808970
1,2,3,7,8-Penta CDF **	pg	ND	3.7	30	6.0	0.0300	0.111		5808970
2,3,4,7,8-Penta CDF **	pg	ND	3.8	30	6.0	0.300	1.14		5808970
1,2,3,4,7,8-Hexa CDF **	pg	ND	4.1	30	6.0	0.100	0.410		5808970
1,2,3,6,7,8-Hexa CDF **	pg	ND	3.9	30	6.0	0.100	0.390		5808970
2,3,4,6,7,8-Hexa CDF **	pg	ND	4.6	30	6.0	0.100	0.460		5808970
1,2,3,7,8,9-Hexa CDF **	pg	ND	5.2	30	6.0	0.100	0.520		5808970
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	3.6	30	9.0	0.0100	0.0360		5808970
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	5.2	30	6.0	0.0100	0.0520		5808970
Octa CDF **	pg	ND	4.1	300	15	0.000300	0.00123		5808970
Total Tetra CDF **	pg	ND	4.4	30	N/A			0	5808970
Total Penta CDF **	pg	ND	3.8	30	N/A			0	5808970
Total Hexa CDF **	pg	ND	4.4	30	N/A			0	5808970
Total Hepta CDF **	pg	ND	4.2	30	N/A			0	5808970
Toxic Equivalency	pg	ND	4.4	N/A	N/A				5808970

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B8P8717
Report Date: 2019/01/15

RWDI Air Inc
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Your P.O. #: 1702401
Sampler Initials: JDF

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		HXI021							
Sampling Date		2018/09/30							
COC Number		N/A				**TOXIC EQUIVALENCY**		# of	
	UNITS	**BEACH-09/30/18**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
TOTAL TOXIC EQUIVALENCY	pg						13.1		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	111							5808970
C13-1234678 HeptaCDF **	%	101							5808970
C13-123478 HexaCDD *	%	117							5808970
C13-123478 HexaCDF **	%	86							5808970
C13-1234789 HeptaCDF **	%	102							5808970
C13-123678 HexaCDD *	%	96							5808970
C13-123678 HexaCDF **	%	109							5808970
C13-12378 PentaCDD *	%	79							5808970
C13-12378 PentaCDF **	%	84							5808970
C13-123789 HexaCDF **	%	82							5808970
C13-23478 PentaCDF **	%	103							5808970
C13-2378 TetraCDD *	%	123							5808970
C13-2378 TetraCDF **	%	107							5808970
C13-OCDD *	%	89							5808970
Cl37-2378 TetraCDD *	%	78							5808970

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

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DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		HXI022							
Sampling Date		2018/10/01							
COC Number		N/A				TOXIC EQUIVALENCY		# of	
	UNITS	**OPG-10/01/18**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	ND	3.9	30	6.0	1.00	3.90		5808970
1,2,3,7,8-Penta CDD *	pg	ND	4.0	30	6.0	1.00	4.00		5808970
1,2,3,4,7,8-Hexa CDD *	pg	ND	3.9	30	6.0	0.100	0.390		5808970
1,2,3,6,7,8-Hexa CDD *	pg	ND	3.8	30	6.0	0.100	0.380		5808970
1,2,3,7,8,9-Hexa CDD *	pg	ND	3.8	30	6.0	0.100	0.380		5808970
1,2,3,4,6,7,8-Hepta CDD *	pg	6.2	4.3	30	9.0	0.0100	0.0620		5808970
Octa CDD *	pg	16.1	5.8	300	9.0	0.000300	0.00483		5808970
Total Tetra CDD *	pg	ND	3.9	30	N/A			0	5808970
Total Penta CDD *	pg	ND	4.0	30	N/A			0	5808970
Total Hexa CDD *	pg	ND	3.8	30	N/A			0	5808970
Total Hepta CDD *	pg	12.0	4.3	30	N/A			2	5808970
2,3,7,8-Tetra CDF **	pg	ND	4.4	30	6.0	0.100	0.440		5808970
1,2,3,7,8-Penta CDF **	pg	ND	4.2	30	6.0	0.0300	0.126		5808970
2,3,4,7,8-Penta CDF **	pg	ND	4.2	30	6.0	0.300	1.26		5808970
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.7	30	6.0	0.100	0.370		5808970
1,2,3,6,7,8-Hexa CDF **	pg	ND	3.5	30	6.0	0.100	0.350		5808970
2,3,4,6,7,8-Hexa CDF **	pg	ND	4.1	30	6.0	0.100	0.410		5808970
1,2,3,7,8,9-Hexa CDF **	pg	ND	4.7	30	6.0	0.100	0.470		5808970
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	3.3	30	9.0	0.0100	0.0330		5808970
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	4.8	30	6.0	0.0100	0.0480		5808970
Octa CDF **	pg	ND	3.8	300	15	0.000300	0.00114		5808970
Total Tetra CDF **	pg	ND	4.4	30	N/A			0	5808970
Total Penta CDF **	pg	ND	4.2	30	N/A			0	5808970
Total Hexa CDF **	pg	ND	4.0	30	N/A			0	5808970
Total Hepta CDF **	pg	ND	3.9	30	N/A			0	5808970
Toxic Equivalency	pg	ND	4.4	N/A	N/A				5808970

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan

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Report Date: 2019/01/15

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DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		HXI022							
Sampling Date		2018/10/01							
COC Number		N/A				**TOXIC EQUIVALENCY**		# of	
	UNITS	**OPG-10/01/18**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
TOTAL TOXIC EQUIVALENCY	pg						12.6		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	103							5808970
C13-1234678 HeptaCDF **	%	96							5808970
C13-123478 HexaCDD *	%	110							5808970
C13-123478 HexaCDF **	%	85							5808970
C13-1234789 HeptaCDF **	%	102							5808970
C13-123678 HexaCDD *	%	95							5808970
C13-123678 HexaCDF **	%	109							5808970
C13-12378 PentaCDD *	%	77							5808970
C13-12378 PentaCDF **	%	82							5808970
C13-123789 HexaCDF **	%	79							5808970
C13-23478 PentaCDF **	%	102							5808970
C13-2378 TetraCDD *	%	120							5808970
C13-2378 TetraCDF **	%	105							5808970
C13-OCDD *	%	85							5808970
Cl37-2378 TetraCDD *	%	79							5808970

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

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DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		HXI023							
Sampling Date		2018/10/01							
COC Number		N/A				**TOXIC EQUIVALENCY**		# of	
	UNITS	**COVE-10/01/18**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
2,3,7,8-Tetra CDD *	pg	ND	4.1	30	6.0	1.00	4.10		5808970
1,2,3,7,8-Penta CDD *	pg	ND	3.5	30	6.0	1.00	3.50		5808970
1,2,3,4,7,8-Hexa CDD *	pg	ND	4.5	30	6.0	0.100	0.450		5808970
1,2,3,6,7,8-Hexa CDD *	pg	ND	4.4	30	6.0	0.100	0.440		5808970
1,2,3,7,8,9-Hexa CDD *	pg	ND	4.3	30	6.0	0.100	0.430		5808970
1,2,3,4,6,7,8-Hepta CDD *	pg	ND	4.2	30	9.0	0.0100	0.0420		5808970
Octa CDD *	pg	11.9	5.4	300	9.0	0.000300	0.00357		5808970
Total Tetra CDD *	pg	ND	4.1	30	N/A			0	5808970
Total Penta CDD *	pg	ND	3.5	30	N/A			0	5808970
Total Hexa CDD *	pg	ND	4.4	30	N/A			0	5808970
Total Hepta CDD *	pg	ND	4.2	30	N/A			0	5808970
2,3,7,8-Tetra CDF **	pg	ND	3.9	30	6.0	0.100	0.390		5808970
1,2,3,7,8-Penta CDF **	pg	ND	4.4	30	6.0	0.0300	0.132		5808970
2,3,4,7,8-Penta CDF **	pg	ND	4.5	30	6.0	0.300	1.35		5808970
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.8	30	6.0	0.100	0.380		5808970
1,2,3,6,7,8-Hexa CDF **	pg	ND	3.7	30	6.0	0.100	0.370		5808970
2,3,4,6,7,8-Hexa CDF **	pg	ND	4.3	30	6.0	0.100	0.430		5808970
1,2,3,7,8,9-Hexa CDF **	pg	ND	4.9	30	6.0	0.100	0.490		5808970
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	3.7	30	9.0	0.0100	0.0370		5808970
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	5.3	30	6.0	0.0100	0.0530		5808970
Octa CDF **	pg	ND	6.5	300	15	0.000300	0.00195		5808970
Total Tetra CDF **	pg	ND	3.9	30	N/A			0	5808970
Total Penta CDF **	pg	ND	4.4	30	N/A			0	5808970
Total Hexa CDF **	pg	ND	4.1	30	N/A			0	5808970
Total Hepta CDF **	pg	ND	4.4	30	N/A			0	5808970
Toxic Equivalency	pg	ND	3.9	N/A	N/A				5808970

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan

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DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		HXI023							
Sampling Date		2018/10/01							
COC Number		N/A				**TOXIC EQUIVALENCY**		# of	
	UNITS	**COVE-10/01/18**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
TOTAL TOXIC EQUIVALENCY	pg						12.6		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	104							5808970
C13-1234678 HeptaCDF **	%	93							5808970
C13-123478 HexaCDD *	%	109							5808970
C13-123478 HexaCDF **	%	84							5808970
C13-1234789 HeptaCDF **	%	101							5808970
C13-123678 HexaCDD *	%	92							5808970
C13-123678 HexaCDF **	%	107							5808970
C13-12378 PentaCDD *	%	70							5808970
C13-12378 PentaCDF **	%	74							5808970
C13-123789 HexaCDF **	%	81							5808970
C13-23478 PentaCDF **	%	101							5808970
C13-2378 TetraCDD *	%	115							5808970
C13-2378 TetraCDF **	%	108							5808970
C13-OCDD *	%	81							5808970
Cl37-2378 TetraCDD *	%	79							5808970

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

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DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		HXI024							
Sampling Date		2018/10/01							
COC Number		N/A				TOXIC EQUIVALENCY		# of	
	UNITS	BEACH-10/01/18	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg	ND	3.5	30	6.0	1.00	3.50		5808970
1,2,3,7,8-Penta CDD *	pg	ND	4.2	30	6.0	1.00	4.20		5808970
1,2,3,4,7,8-Hexa CDD *	pg	ND	4.3	30	6.0	0.100	0.430		5808970
1,2,3,6,7,8-Hexa CDD *	pg	ND	4.2	30	6.0	0.100	0.420		5808970
1,2,3,7,8,9-Hexa CDD *	pg	ND	4.1	30	6.0	0.100	0.410		5808970
1,2,3,4,6,7,8-Hepta CDD *	pg	ND	3.4	30	9.0	0.0100	0.0340		5808970
Octa CDD *	pg	4.0	3.3	300	9.0	0.000300	0.00120		5808970
Total Tetra CDD *	pg	ND	3.5	30	N/A			0	5808970
Total Penta CDD *	pg	ND	4.2	30	N/A			0	5808970
Total Hexa CDD *	pg	ND	4.2	30	N/A			0	5808970
Total Hepta CDD *	pg	ND	3.4	30	N/A			0	5808970
2,3,7,8-Tetra CDF **	pg	ND	3.4	30	6.0	0.100	0.340		5808970
1,2,3,7,8-Penta CDF **	pg	ND	3.2	30	6.0	0.0300	0.0960		5808970
2,3,4,7,8-Penta CDF **	pg	ND	3.2	30	6.0	0.300	0.960		5808970
1,2,3,4,7,8-Hexa CDF **	pg	ND	3.2	30	6.0	0.100	0.320		5808970
1,2,3,6,7,8-Hexa CDF **	pg	ND	3.1	30	6.0	0.100	0.310		5808970
2,3,4,6,7,8-Hexa CDF **	pg	ND	3.7	30	6.0	0.100	0.370		5808970
1,2,3,7,8,9-Hexa CDF **	pg	ND	4.2	30	6.0	0.100	0.420		5808970
1,2,3,4,6,7,8-Hepta CDF **	pg	ND	3.4	30	9.0	0.0100	0.0340		5808970
1,2,3,4,7,8,9-Hepta CDF **	pg	ND	4.9	30	6.0	0.0100	0.0490		5808970
Octa CDF **	pg	ND	3.7	300	15	0.000300	0.00111		5808970
Total Tetra CDF **	pg	ND	3.4	30	N/A			0	5808970
Total Penta CDF **	pg	ND	3.2	30	N/A			0	5808970
Total Hexa CDF **	pg	ND	3.5	30	N/A			0	5808970
Total Hepta CDF **	pg	ND	4.0	30	N/A			0	5808970
Toxic Equivalency	pg	ND	3.4	N/A	N/A				5808970

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
ND = Not detected
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan

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Maxxam Job #: B8P8717
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1702401
Site Location: ST MARYS AMB
Your P.O. #: 1702401
Sampler Initials: JDF

DIOXINS AND FURANS BY HRMS (PUF AND FILTER)

Maxxam ID		HXI024							
Sampling Date		2018/10/01							
COC Number		N/A				**TOXIC EQUIVALENCY**		# of	
	UNITS	**BEACH-10/01/18**	**EDL**	**RDL**	**MDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
TOTAL TOXIC EQUIVALENCY	pg						11.9		
Surrogate Recovery (%)									
C13-1234678 HeptaCDD *	%	105							5808970
C13-1234678 HeptaCDF **	%	98							5808970
C13-123478 HexaCDD *	%	106							5808970
C13-123478 HexaCDF **	%	87							5808970
C13-1234789 HeptaCDF **	%	101							5808970
C13-123678 HexaCDD *	%	100							5808970
C13-123678 HexaCDF **	%	109							5808970
C13-12378 PentaCDD *	%	82							5808970
C13-12378 PentaCDF **	%	86							5808970
C13-123789 HexaCDF **	%	79							5808970
C13-23478 PentaCDF **	%	103							5808970
C13-2378 TetraCDD *	%	126							5808970
C13-2378 TetraCDF **	%	108							5808970
C13-OCDD *	%	84							5808970
Cl37-2378 TetraCDD *	%	78							5808970

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

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TEST SUMMARY

Maxxam ID: HXI019
Sample ID: OPG-09/30/18
Matrix: PUF AND FILTER

Collected: 2018/09/30
Shipped:
Received: 2018/10/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5808970	2018/10/06	2018/10/19	Angel Guerrero
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5805551	2018/10/06	2018/10/29	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5771413	2018/10/06	2018/10/19	Fan (Carrie) Jiang

Maxxam ID: HXI020
Sample ID: COVE-09/30/18
Matrix: PUF AND FILTER

Collected: 2018/09/30
Shipped:
Received: 2018/10/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5808970	2018/10/06	2018/10/19	Angel Guerrero
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5805551	2018/10/06	2018/10/29	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5771413	2018/10/06	2018/10/19	Fan (Carrie) Jiang

Maxxam ID: HXI021
Sample ID: BEACH-09/30/18
Matrix: PUF AND FILTER

Collected: 2018/09/30
Shipped:
Received: 2018/10/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5808970	2018/10/06	2018/10/19	Angel Guerrero
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5805551	2018/10/06	2018/10/29	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5771413	2018/10/06	2018/10/19	Fan (Carrie) Jiang

Maxxam ID: HXI022
Sample ID: OPG-10/01/18
Matrix: PUF AND FILTER

Collected: 2018/10/01
Shipped:
Received: 2018/10/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5808970	2018/10/06	2018/10/19	Angel Guerrero
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5805551	2018/10/06	2018/10/29	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5771413	2018/10/06	2018/10/19	Fan (Carrie) Jiang

Maxxam ID: HXI023
Sample ID: COVE-10/01/18
Matrix: PUF AND FILTER

Collected: 2018/10/01
Shipped:
Received: 2018/10/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5808970	2018/10/06	2018/10/19	Angel Guerrero
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5805551	2018/10/06	2018/10/29	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5771413	2018/10/06	2018/10/19	Fan (Carrie) Jiang

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TEST SUMMARY

Maxxam ID: HXI024
Sample ID: BEACH-10/01/18
Matrix: PUF AND FILTER

Collected: 2018/10/01
Shipped:
Received: 2018/10/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Ambient Air (TO-9)	HRMS/MS	5808970	2018/10/06	2018/10/19	Angel Guerrero
PAHs in Ambient Air Samples by HRMS	HRMS/MS	5805551	2018/10/06	2018/10/29	Branko Vrzic
PAH's in Air (CARB429mod)	GC/MS	5771413	2018/10/06	2018/10/19	Fan (Carrie) Jiang

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GENERAL COMMENTS

Dibenzo(a,c) anthracene, Benzo(b)anthracene, Triphenylene and Picene : These parameters are not accredited for the submitted matrix. Triphenylene co-elutes with Chrysene and Dibenzo(a,c)anthracene co-elutes with Dibenz(a,h)anthracene. The data reported is the total of the 2 compounds if both are present.

Benzo(b)fluoranthene and Benzo(j)fluoranthene co-elute and values reported as Benzo(b)fluoranthene may contain both b & j.

Sample HXI022 [OPG-10/01/18] : Low d10-fluorene field spike recovery. Suspect sample matrix as cause due to acceptable recovery of d14-terphenyl field spike.

RESULTS OF ANALYSES OF PUF AND FILTER

PAHs in Ambient Air Samples by HRMS: Benzo(a)pyrene-2H12 used in analysis for test code PAHHR-A.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5771413	FJI	Spiked Blank	D10-2-Methylnaphthalene	2018/10/19		60	%	50 - 150
			D10-Fluoranthene	2018/10/19		62	%	50 - 150
			D10-Phenanthrene	2018/10/19		62	%	50 - 150
			D12-Benzo(a)anthracene	2018/10/19		76	%	50 - 150
			D12-Benzo(a)pyrene	2018/10/19		74	%	50 - 150
			D12-Benzo(b)fluoranthene	2018/10/19		76	%	50 - 150
			D12-Benzo(ghi)perylene	2018/10/19		72	%	50 - 150
			D12-Benzo(k)fluoranthene	2018/10/19		74	%	50 - 150
			D12-Chrysene	2018/10/19		74	%	50 - 150
			D12-Indeno(1,2,3-cd)pyrene	2018/10/19		72	%	50 - 150
			D12-Perylene	2018/10/19		72	%	50 - 150
			D14-Dibenzo(a,h)anthracene	2018/10/19		70	%	50 - 150
			D8-Acenaphthylene	2018/10/19		62	%	50 - 150
			D8-Naphthalene	2018/10/19		58	%	50 - 150
			Acenaphthene	2018/10/19		65	%	60 - 130
			Acenaphthylene	2018/10/19		68	%	60 - 130
			Anthracene	2018/10/19		68	%	60 - 130
			Benzo(a)anthracene	2018/10/19		80	%	60 - 130
			Benzo(b)fluoranthene	2018/10/19		85	%	60 - 130
			Benzo(g,h,i)perylene	2018/10/19		78	%	60 - 130
			Benzo(k)fluoranthene	2018/10/19		75	%	60 - 130
			Chrysene	2018/10/19		83	%	60 - 130
			Dibenz(a,h)anthracene	2018/10/19		80	%	60 - 130
			Fluoranthene	2018/10/19		68	%	60 - 130
			Fluorene	2018/10/19		68	%	60 - 130
			Indeno(1,2,3-cd)pyrene	2018/10/19		80	%	60 - 130
			Naphthalene	2018/10/19		68	%	60 - 130
			Phenanthrene	2018/10/19		68	%	60 - 130
			Pyrene	2018/10/19		65	%	60 - 130
5771413	FJI	RPD	Acenaphthene	2018/10/19	7.4		%	50
			Acenaphthylene	2018/10/19	3.6		%	50
			Anthracene	2018/10/19	0		%	50
			Benzo(a)anthracene	2018/10/19	3.1		%	50
			Benzo(b)fluoranthene	2018/10/19	5.7		%	50
			Benzo(g,h,i)perylene	2018/10/19	0		%	50
			Benzo(k)fluoranthene	2018/10/19	0		%	50
			Chrysene	2018/10/19	3.0		%	50
			Dibenz(a,h)anthracene	2018/10/19	3.1		%	50
			Fluoranthene	2018/10/19	0		%	50
			Fluorene	2018/10/19	3.6		%	50
			Indeno(1,2,3-cd)pyrene	2018/10/19	3.1		%	50
			Naphthalene	2018/10/19	7.1		%	50
			Phenanthrene	2018/10/19	3.6		%	50
			Pyrene	2018/10/19	3.8		%	50
5771413	FJI	Method Blank	D10-2-Methylnaphthalene	2018/10/19		64	%	50 - 150
			D10-Fluoranthene	2018/10/19		66	%	50 - 150
			D10-Phenanthrene	2018/10/19		64	%	50 - 150
			D12-Benzo(a)anthracene	2018/10/19		78	%	50 - 150
			D12-Benzo(a)pyrene	2018/10/19		74	%	50 - 150
			D12-Benzo(b)fluoranthene	2018/10/19		80	%	50 - 150
			D12-Benzo(ghi)perylene	2018/10/19		72	%	50 - 150
			D12-Benzo(k)fluoranthene	2018/10/19		74	%	50 - 150

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RWDI Air Inc
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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			D12-Chrysene	2018/10/19		78	%	50 - 150
			D12-Indeno(1,2,3-cd)pyrene	2018/10/19		70	%	50 - 150
			D12-Perylene	2018/10/19		76	%	50 - 150
			D14-Dibenzo(a,h)anthracene	2018/10/19		70	%	50 - 150
			D8-Acenaphthylene	2018/10/19		64	%	50 - 150
			D8-Naphthalene	2018/10/19		60	%	50 - 150
			1-Methylnaphthalene	2018/10/19	ND, RDL=0.15		ug	
			1-Methylphenanthrene	2018/10/19	ND, RDL=0.15		ug	
			2-Chloronaphthalene	2018/10/19	ND, RDL=0.15		ug	
			2-Methylanthracene	2018/10/19	ND, RDL=0.15		ug	
			2-Methylnaphthalene	2018/10/19	ND, RDL=0.15		ug	
			3-Methylcholanthrene	2018/10/19	ND, RDL=3.0		ug	
			7,12-Dimethylbenzo(a)anthracene	2018/10/19	ND, RDL=0.60		ug	
			9,10-Dimethylanthracene	2018/10/19	ND, RDL=0.60		ug	
			Acenaphthene	2018/10/19	ND, RDL=0.075		ug	
			Acenaphthylene	2018/10/19	ND, RDL=0.075		ug	
			Anthracene	2018/10/19	ND, RDL=0.075		ug	
			Benzo(a)anthracene	2018/10/19	ND, RDL=0.075		ug	
			Benzo(a)fluorene	2018/10/19	ND, RDL=0.15		ug	
			Benzo(b)fluoranthene	2018/10/19	ND, RDL=0.075		ug	
			Benzo(b)fluorene	2018/10/19	ND, RDL=0.15		ug	
			Benzo(e)pyrene	2018/10/19	ND, RDL=0.15		ug	
			Benzo(g,h,i)perylene	2018/10/19	ND, RDL=0.075		ug	
			Benzo(k)fluoranthene	2018/10/19	ND, RDL=0.075		ug	
			Chrysene	2018/10/19	ND, RDL=0.075		ug	
			Coronene	2018/10/19	ND, RDL=0.15		ug	
			Dibenz(a,h)anthracene	2018/10/19	ND, RDL=0.075		ug	
			Dibenzo(a,c) anthracene + Picene	2018/10/19	ND, RDL=0.15		ug	
			Dibenzo(a,c)anthracene	2018/10/19	ND, RDL=0.15		ug	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Dibenzo(a,e)pyrene	2018/10/19	ND, RDL=0.30		ug	
			Fluoranthene	2018/10/19	ND, RDL=0.075		ug	
			Fluorene	2018/10/19	ND, RDL=0.075		ug	
			Indeno(1,2,3-cd)pyrene	2018/10/19	ND, RDL=0.075		ug	
			Naphthalene	2018/10/19	ND, RDL=0.11		ug	
			Perylene	2018/10/19	ND, RDL=0.15		ug	
			Phenanthrene	2018/10/19	ND, RDL=0.075		ug	
			Picene	2018/10/19	ND, RDL=0.15		ug	
			Pyrene	2018/10/19	ND, RDL=0.075		ug	
			Tetralin	2018/10/19	ND, RDL=0.15		ug	
5805551	BY	Spiked Blank	Benzo(a)pyrene (13C4)	2018/10/29		115 (1)	%	50 - 150
			Benzo(a)pyrene	2018/10/29		109	%	60 - 140
5805551	BY	RPD	Benzo(a)pyrene	2018/10/29	3.6		%	50
5805551	BY	Method Blank	Benzo(a)pyrene (13C4)	2018/10/29		104 (1)	%	50 - 150
			Benzo(a)pyrene	2018/10/29	0.00187, RDL=0.030		ug	
5808970	AGU	Spiked Blank	C13-1234678 HeptaCDD	2018/10/19		104	%	25 - 130
			C13-1234678 HeptaCDF	2018/10/19		100	%	25 - 130
			C13-123678 HexaCDD	2018/10/19		91	%	40 - 130
			C13-123678 HexaCDF	2018/10/19		105	%	40 - 130
			C13-12378 PentaCDD	2018/10/19		81	%	40 - 130
			C13-12378 PentaCDF	2018/10/19		86	%	40 - 130
			C13-123789 HexaCDF	2018/10/19		75	%	70 - 130
			C13-2378 TetraCDD	2018/10/19		127	%	40 - 130
			C13-2378 TetraCDF	2018/10/19		112	%	40 - 130
			C13-OCDD	2018/10/19		89	%	25 - 130
			2,3,7,8-Tetra CDD	2018/10/19		86	%	80 - 140
			1,2,3,7,8-Penta CDD	2018/10/19		88	%	80 - 140
			1,2,3,4,7,8-Hexa CDD	2018/10/19		95	%	80 - 140
			1,2,3,6,7,8-Hexa CDD	2018/10/19		93	%	80 - 140
			1,2,3,7,8,9-Hexa CDD	2018/10/19		101	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDD	2018/10/19		89	%	80 - 140
			Octa CDD	2018/10/19		83	%	80 - 140
			2,3,7,8-Tetra CDF	2018/10/19		84	%	80 - 140
			1,2,3,7,8-Penta CDF	2018/10/19		84	%	80 - 140
			2,3,4,7,8-Penta CDF	2018/10/19		83	%	80 - 140
			1,2,3,4,7,8-Hexa CDF	2018/10/19		93	%	80 - 140
			1,2,3,6,7,8-Hexa CDF	2018/10/19		91	%	80 - 140
			2,3,4,6,7,8-Hexa CDF	2018/10/19		99	%	80 - 140
			1,2,3,7,8,9-Hexa CDF	2018/10/19		101	%	80 - 140
			1,2,3,4,6,7,8-Hepta CDF	2018/10/19		86	%	80 - 140
			1,2,3,4,7,8,9-Hepta CDF	2018/10/19		90	%	80 - 140

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Octa CDF	2018/10/19		91	%	80 - 140
5808970	AGU	RPD	2,3,7,8-Tetra CDD	2018/10/19	7.8		%	20
			1,2,3,7,8-Penta CDD	2018/10/19	7.7		%	20
			1,2,3,4,7,8-Hexa CDD	2018/10/19	17		%	20
			1,2,3,6,7,8-Hexa CDD	2018/10/19	7.3		%	20
			1,2,3,7,8,9-Hexa CDD	2018/10/19	1.0		%	20
			1,2,3,4,6,7,8-Hepta CDD	2018/10/19	7.6		%	20
			Octa CDD	2018/10/19	0		%	20
			2,3,7,8-Tetra CDF	2018/10/19	8.0		%	20
			1,2,3,7,8-Penta CDF	2018/10/19	8.0		%	20
			2,3,4,7,8-Penta CDF	2018/10/19	8.1		%	20
			1,2,3,4,7,8-Hexa CDF	2018/10/19	3.2		%	20
			1,2,3,6,7,8-Hexa CDF	2018/10/19	8.4		%	20
			2,3,4,6,7,8-Hexa CDF	2018/10/19	27 (2)		%	20
			1,2,3,7,8,9-Hexa CDF	2018/10/19	10		%	20
			1,2,3,4,6,7,8-Hepta CDF	2018/10/19	7.8		%	20
			1,2,3,4,7,8,9-Hepta CDF	2018/10/19	5.4		%	20
			Octa CDF	2018/10/19	0		%	20
5808970	AGU	Method Blank	C13-1234678 HeptaCDD	2018/10/18		98	%	25 - 130
			C13-1234678 HeptaCDF	2018/10/18		91	%	25 - 130
			C13-123678 HexaCDD	2018/10/18		95	%	40 - 130
			C13-123678 HexaCDF	2018/10/18		101	%	40 - 130
			C13-12378 PentaCDD	2018/10/18		100	%	40 - 130
			C13-12378 PentaCDF	2018/10/18		97	%	40 - 130
			C13-123789 HexaCDF	2018/10/18		77	%	70 - 130
			C13-2378 TetraCDD	2018/10/18		121	%	40 - 130
			C13-2378 TetraCDF	2018/10/18		100	%	40 - 130
			C13-OCDD	2018/10/18		77	%	25 - 130
			2,3,7,8-Tetra CDD	2018/10/18	ND, EDL=3.6		pg	
			1,2,3,7,8-Penta CDD	2018/10/18	ND, EDL=4.1		pg	
			1,2,3,4,7,8-Hexa CDD	2018/10/18	ND, EDL=4.5		pg	
			1,2,3,6,7,8-Hexa CDD	2018/10/18	ND, EDL=4.4		pg	
			1,2,3,7,8,9-Hexa CDD	2018/10/18	ND, EDL=4.4		pg	
			1,2,3,4,6,7,8-Hepta CDD	2018/10/18	ND, EDL=4.3		pg	
			Octa CDD	2018/10/18	ND, EDL=4.5		pg	
			Total Tetra CDD	2018/10/18	ND, EDL=3.6		pg	
			Total Penta CDD	2018/10/18	ND, EDL=12 (3)		pg	
			Total Hexa CDD	2018/10/18	ND, EDL=4.4		pg	
			Total Hepta CDD	2018/10/18	ND, EDL=4.3		pg	
			2,3,7,8-Tetra CDF	2018/10/18	ND, EDL=3.8		pg	

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Maxxam Job #: B8P8717
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1702401
Site Location: ST MARYS AMB
Your P.O. #: 1702401
Sampler Initials: JDF

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8-Penta CDF	2018/10/18	ND, EDL=4.1		pg	
			2,3,4,7,8-Penta CDF	2018/10/18	ND, EDL=4.2		pg	
			1,2,3,4,7,8-Hexa CDF	2018/10/18	ND, EDL=3.3		pg	
			1,2,3,6,7,8-Hexa CDF	2018/10/18	ND, EDL=3.2		pg	
			2,3,4,6,7,8-Hexa CDF	2018/10/18	ND, EDL=3.7		pg	
			1,2,3,7,8,9-Hexa CDF	2018/10/18	ND, EDL=4.2		pg	
			1,2,3,4,6,7,8-Hepta CDF	2018/10/18	ND, EDL=3.6		pg	
			1,2,3,4,7,8,9-Hepta CDF	2018/10/18	ND, EDL=5.2		pg	
			Octa CDF	2018/10/18	ND, EDL=3.8		pg	
			Total Tetra CDF	2018/10/18	ND, EDL=3.8		pg	
			Total Penta CDF	2018/10/18	ND, EDL=4.2		pg	
			Total Hexa CDF	2018/10/18	ND, EDL=3.6		pg	
			Total Hepta CDF	2018/10/18	ND, EDL=4.2		pg	
			Toxic Equivalency	2018/10/18	ND, EDL=3.8		pg	

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

(1) Benzo(a)pyrene-2H12 used in analysis.

(2) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(3) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B8P8717
Report Date: 2019/01/15

RWDI Air Inc
Client Project #: 1702401
Site Location: ST MARYS AMB
Your P.O. #: 1702401
Sampler Initials: JDF

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Cathy Xu, Scientific Specialist, Ultra Trace Analysis, HRMS

Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

CHARTERED
Rodney A. Major
CHEMIST

Rodney Major, Manager Organic Processing Lab

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Chain of Custody Form - AIR

31935

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Fax: (905) 817-5777

CAM FCD-01302 /2 Page ____ of ____

ANALYSIS REQUESTED

CLIENT INFORMATION SECTION

Company Name: RWDI
Project Manager: Kirk Easto
e-mail: Kirk.Easto@RWDI.com
Address:
Phone: (519) 823-1311 Fax:
Sampled by: JDF

Analysis requested (column 1): PUF (Dioxins & Furans) (PAH'S) 3 See list Retro.

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time	PUF (Dioxins & Furans)(PAH'S)
OPG - 09/30/18 (2 SAMPLES)		8 CFM	09/30	24 HRS (+/-)	✓
COVE - 09/30/18 (2 SAMPLES)		8 CFM	09/30	(+/-) 24 HRS	✓
BEACH - 09/30/18 (2 SAMPLES)		8 CFM	09/30	(+/-) 24 HRS	✓
OPG - 10/01/18 (2 SAMPLES)		8 CFM	10/01	(+/-) 24 HRS	✓
COVE - 10/01/18 (2 SAMPLES)		8 CFM	10/01	(+/-) 24 HRS	✓
BEACH - 10/01/18 (2 SAMPLES)		8 CFM	10/01	(+/-) 24 HRS	✓

02-Oct-18 12:09
Clayton Johnson
B8P8717
THP AIR-FRIDGE

TAT Requirement

STD 10 Business day ☑
Rush 5 Business day * ☐
Rush 2 Business day * ☐
* need approval from Maxxam

PROJECT INFORMATION

Project #: 1702401
Name: ST MARYS AMB
PO #: 1702401
Maxxam Quote #:
Maxxam Contact: C. Johnson

REPORTING REQUIREMENTS

Summary Report only ☐
EDD ☐
Regulation

Notes

Please note if this samples are "Industrial Hygiene" samples
If submitting dustfall samples, please indicate the diameter of the jar opening in cm.

PROJECT SPECIFIC COMMENTS

* SEE KIRK FOR PARAMETER LIST / VOLUME IF NEEDED

Client Signature:
Affiliation:
Date/Time: 10/02/18

Received by: K. Van Gr... KATHRYN VAN GRUNSVEN
Affiliation:
Date/Time: 2018/10/02 12:09

COC-1031 (11/2017)

13/15/13 ICE PACKS

Site Location: ST. MARYS
Your C.O.C. #: 36819

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/12/19
Report #: R5531848
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8X2263
Received: 2018/12/10, 10:21

Sample Matrix: Air
Samples Received: 15

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Canister Pressure (TO-15)	15	N/A	2018/12/13	BRL SOP-00304	EPA TO-15 m
Volatile Compounds in Air (SUMMA) (1)	15	N/A	2018/12/13	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air by GC/MS/SIM (2)	15	N/A	2018/12/13	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	15	N/A	2018/12/13	BRL SOP-00304	EPA TO-15 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Maxxam for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

(2) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target

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Maxxam
A Bureau Veritas Group Company

Site Location: ST. MARYS
Your C.O.C. #: 36819

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/12/19
Report #: R5531848
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8X2263
Received: 2018/12/10, 10:21

analytes in order for the batch to have been considered clean. Each canister underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Maxxam for a period of 5 calendar days from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B8X2263
Report Date: 2018/12/19

RWDI Air Inc
Site Location: ST. MARYS

RESULTS OF ANALYSES OF AIR

Maxxam ID		INN471	INN472	INN473	INN474	INN475	INN476	INN477		
Sampling Date		2018/12/04	2018/12/04	2018/12/04	2018/12/05	2018/12/05	2018/12/06	2018/12/06		
COC Number		36819	36819	36819	36819	36819	36819	36819		
	UNITS	**OPG-DEC04**	**BEACH-DEC04**	**COVE-DEC04**	**OPG-DEC05**	**COVE-DEC05**	**OPG-DEC06**	**COVE-DEC06**	**MDL**	**QC Batch**
Pressure on Receipt	psig	(-1.7)	(-1.4)	(-1.6)	(-1.9)	(-1.6)	(-2.5)	(-2.5)		5889698
QC Batch = Quality Control Batch										

Maxxam ID		INN478	INN479	INN480	INN481	INN482	INN483		
Sampling Date		2018/12/06	2018/12/07	2018/12/07	2018/12/07	2018/12/08	2018/12/08		
COC Number		36819	36819	36819	36819	36819	36819		
	UNITS	**BEACH-DEC06**	**OPG-DEC07**	**COVE-DEC07**	**BEACH-DEC07**	**OPG-DEC08**	**COVE-DEC08**	**MDL**	**QC Batch**
Pressure on Receipt	psig	(-4.3)	(-2.3)	(-1.9)	(-1.4)	(-2.6)	(-2.3)		5889698
QC Batch = Quality Control Batch									

Maxxam ID		INN484	INN485		
Sampling Date		2018/12/08			
COC Number		36819	36819		
	UNITS	**BEACH-DEC08**	**BLANK**	**MDL**	**QC Batch**
Pressure on Receipt	psig	(-2.0)	(-14.3)		5889698
QC Batch = Quality Control Batch					

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Maxxam Job #: B8X2263
Report Date: 2018/12/19

RWDI Air Inc
Site Location: ST. MARYS

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		INN471	INN472	INN473	INN474	INN475			
Sampling Date		2018/12/04	2018/12/04	2018/12/04	2018/12/05	2018/12/05			
COC Number		36819	36819	36819	36819	36819			
	UNITS	**OPG-DEC04**	**BEACH-DEC04**	**COVE-DEC04**	**OPG-DEC05**	**COVE-DEC05**	**RDL**	**MDL**	**QC Batch**
2-Propanone	ppbv	1.04	3.04	1.05	1.79	2.02	0.20	0.20	5889692
Chloromethane	ppbv	0.52	0.52	0.50	0.56	0.54	0.30	0.10	5887396
Vinyl Chloride	ppbv	ND	ND	ND	ND	ND	0.020	0.020	5889692
Chloroethane	ppbv	ND	ND	ND	ND	ND	0.30	0.10	5887396
Methyl Ethyl Ketone (2-Butanone)	ppbv	0.27	0.41	0.23	0.48	0.44	0.10	0.10	5889692
cis-1,2-Dichloroethylene	ppbv	ND	ND	ND	ND	ND	0.050	0.050	5889692
trans-1,2-Dichloroethylene	ppbv	ND	ND	ND	ND	ND	0.10	0.10	5889692
Methylene Chloride(Dichloromethane)	ppbv	0.169	0.165	0.155	0.176	0.189	0.050	0.050	5889692
Chloroform	ppbv	ND	ND	ND	ND	ND	0.040	0.040	5889692
Carbon Tetrachloride	ppbv	0.126	0.128	0.130	0.124	0.123	0.050	0.050	5889692
1,1-Dichloroethane	ppbv	ND	ND	ND	ND	ND	0.050	0.050	5889692
1,2-Dichloroethane	ppbv	0.031	0.032	0.033	0.033	0.034	0.010	0.010	5889692
Ethylene Dibromide	ppbv	ND	ND	ND	ND	ND	0.010	0.010	5889692
1,1,1-Trichloroethane	ppbv	ND	ND	ND	ND	ND	0.050	0.050	5889692
1,1,2-Trichloroethane	ppbv	ND	ND	ND	ND	ND	0.012	0.012	5889692
1,1,2,2-Tetrachloroethane	ppbv	ND	ND	ND	ND	ND	0.0027	0.0027	5889692
1,2-Dichloropropane	ppbv	ND	ND	ND	ND	ND	0.050	0.050	5889692
Bromomethane	ppbv	ND	ND	ND	ND	ND	0.050	0.050	5889692
Bromoform	ppbv	ND	ND	ND	ND	ND	0.10	0.10	5889692
Bromodichloromethane	ppbv	ND	ND	ND	ND	ND	0.20	0.10	5887396
Dibromochloromethane	ppbv	ND	ND	ND	ND	ND	0.20	0.10	5887396
Trichloroethylene	ppbv	ND	ND	ND	ND	ND	0.050	0.050	5889692
Tetrachloroethylene	ppbv	ND	ND	ND	ND	ND	0.050	0.050	5889692
Benzene	ppbv	0.176	0.195	0.228	0.193	0.269	0.050	0.050	5889692
Toluene	ppbv	0.189	0.231	0.273	0.325	0.429	0.050	0.050	5889692
Ethylbenzene	ppbv	ND	ND	ND	ND	0.067	0.050	0.050	5889692
p+m-Xylene	ppbv	ND	0.13	0.11	0.13	0.21	0.10	0.10	5889692
o-Xylene	ppbv	ND	ND	ND	ND	0.080	0.050	0.050	5889692
Styrene	ppbv	0.054	ND	ND	ND	0.218	0.050	0.050	5889692
Chlorobenzene	ppbv	ND	ND	ND	ND	ND	0.050	0.050	5889692
Cumene (Isopropylbenzene)	ppbv	ND	ND	ND	ND	ND	0.50	0.10	5889702
Total Xylenes	ppbv	ND	ND	ND	0.17	0.29	0.15	0.15	5889692
1,1,1,2-Tetrachloroethane	ppbv	ND	ND	ND	ND	ND	0.021	0.021	5889692
Surrogate Recovery (%)									
Bromochloromethane	%	101	99	99	96	96			5889702
D5-Chlorobenzene	%	88	85	84	82	82			5889702

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		INN471	INN472	INN473	INN474	INN475			
Sampling Date		2018/12/04	2018/12/04	2018/12/04	2018/12/05	2018/12/05			
COC Number		36819	36819	36819	36819	36819			
	UNITS	**OPG-DEC04**	**BEACH-DEC04**	**COVE-DEC04**	**OPG-DEC05**	**COVE-DEC05**	**RDL**	**MDL**	**QC Batch**
Difluorobenzene	%	87	84	81	80	80			5889702
Bromochloromethane	%	101	99	99	96	96			5889692
D5-Chlorobenzene	%	88	85	84	82	82			5889692
Difluorobenzene	%	87	84	81	80	80			5889692
Bromochloromethane	%	101	99	99	96	96			5887396
D5-Chlorobenzene	%	88	85	84	82	82			5887396
Difluorobenzene	%	87	84	81	80	80			5887396

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8X2263
Report Date: 2018/12/19

RWDI Air Inc
Site Location: ST. MARYS

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		INN476	INN477	INN478	INN479	INN480			
Sampling Date		2018/12/06	2018/12/06	2018/12/06	2018/12/07	2018/12/07			
COC Number		36819	36819	36819	36819	36819			
	UNITS	**OPG-DEC06**	**COVE-DEC06**	**BEACH-DEC06**	**OPG-DEC07**	**COVE-DEC07**	**RDL**	**MDL**	**QC Batch**
2-Propanone	ppbv	1.68	1.33	1.03	0.89	2.21	0.20	0.20	5889692
Chloromethane	ppbv	0.56	0.54	0.56	0.55	0.56	0.30	0.10	5887396
Vinyl Chloride	ppbv	ND	ND	ND	ND	ND	0.020	0.020	5889692
Chloroethane	ppbv	ND	ND	ND	ND	ND	0.30	0.10	5887396
Methyl Ethyl Ketone (2-Butanone)	ppbv	0.48	0.30	0.61	0.23	0.28	0.10	0.10	5889692
cis-1,2-Dichloroethylene	ppbv	ND	ND	ND	ND	ND	0.050	0.050	5889692
trans-1,2-Dichloroethylene	ppbv	ND	ND	ND	ND	ND	0.10	0.10	5889692
Methylene Chloride(Dichloromethane)	ppbv	0.182	0.152	0.183	0.173	0.193	0.050	0.050	5889692
Chloroform	ppbv	ND	ND	ND	ND	ND	0.040	0.040	5889692
Carbon Tetrachloride	ppbv	0.141	0.147	0.148	0.142	0.153	0.050	0.050	5889692
1,1-Dichloroethane	ppbv	ND	ND	ND	ND	ND	0.050	0.050	5889692
1,2-Dichloroethane	ppbv	0.034	0.035	0.034	0.031	0.032	0.010	0.010	5889692
Ethylene Dibromide	ppbv	ND	ND	ND	ND	ND	0.010	0.010	5889692
1,1,1-Trichloroethane	ppbv	ND	ND	ND	ND	ND	0.050	0.050	5889692
1,1,2-Trichloroethane	ppbv	ND	ND	ND	ND	ND	0.012	0.012	5889692
1,1,2,2-Tetrachloroethane	ppbv	ND	ND	ND	ND	ND	0.0027	0.0027	5889692
1,2-Dichloropropane	ppbv	ND	ND	ND	ND	ND	0.050	0.050	5889692
Bromomethane	ppbv	ND	ND	ND	ND	ND	0.050	0.050	5889692
Bromoform	ppbv	ND	ND	ND	ND	ND	0.10	0.10	5889692
Bromodichloromethane	ppbv	ND	ND	ND	ND	ND	0.20	0.10	5887396
Dibromochloromethane	ppbv	ND	ND	ND	ND	ND	0.20	0.10	5887396
Trichloroethylene	ppbv	ND	ND	ND	ND	ND	0.050	0.050	5889692
Tetrachloroethylene	ppbv	ND	ND	ND	ND	ND	0.050	0.050	5889692
Benzene	ppbv	0.152	0.166	0.160	0.138	0.124	0.050	0.050	5889692
Toluene	ppbv	0.166	0.162	0.211	0.088	0.084	0.050	0.050	5889692
Ethylbenzene	ppbv	ND	ND	ND	ND	ND	0.050	0.050	5889692
p+m-Xylene	ppbv	ND	ND	ND	ND	ND	0.10	0.10	5889692
o-Xylene	ppbv	ND	ND	ND	ND	ND	0.050	0.050	5889692
Styrene	ppbv	ND	ND	ND	ND	ND	0.050	0.050	5889692
Chlorobenzene	ppbv	ND	ND	ND	ND	ND	0.050	0.050	5889692
Cumene (Isopropylbenzene)	ppbv	ND	ND	ND	ND	ND	0.50	0.10	5889702
Total Xylenes	ppbv	ND	ND	ND	ND	ND	0.15	0.15	5889692
1,1,1,2-Tetrachloroethane	ppbv	ND	ND	ND	ND	ND	0.021	0.021	5889692
Surrogate Recovery (%)									
Bromochloromethane	%	96	93	89	93	93			5889702
D5-Chlorobenzene	%	79	78	74	74	73			5889702

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B8X2263
Report Date: 2018/12/19

RWDI Air Inc
Site Location: ST. MARYS

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		INN476	INN477	INN478	INN479	INN480			
Sampling Date		2018/12/06	2018/12/06	2018/12/06	2018/12/07	2018/12/07			
COC Number		36819	36819	36819	36819	36819			
	UNITS	**OPG-DEC06**	**COVE-DEC06**	**BEACH-DEC06**	**OPG-DEC07**	**COVE-DEC07**	**RDL**	**MDL**	**QC Batch**
Difluorobenzene	%	77	74	70	73	70			5889702
Bromochloromethane	%	96	93	89	93	93			5889692
D5-Chlorobenzene	%	79	78	74	74	73			5889692
Difluorobenzene	%	77	74	70	73	70			5889692
Bromochloromethane	%	96	93	89	93	93			5887396
D5-Chlorobenzene	%	79	78	74	74	73			5887396
Difluorobenzene	%	77	74	70	73	70			5887396

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8X2263
Report Date: 2018/12/19

RWDI Air Inc
Site Location: ST. MARYS

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		INN481	INN482	INN483	INN484			
Sampling Date		2018/12/07	2018/12/08	2018/12/08	2018/12/08			
COC Number		36819	36819	36819	36819			
	UNITS	**BEACH-DEC07**	**OPG-DEC08**	**COVE-DEC08**	**BEACH-DEC08**	**RDL**	**MDL**	**QC Batch**
2-Propanone	ppbv	0.82	1.60	1.60	0.73	0.20	0.20	5889692
Chloromethane	ppbv	0.53	0.56	0.57	0.54	0.30	0.10	5887396
Vinyl Chloride	ppbv	ND	ND	ND	ND	0.020	0.020	5889692
Chloroethane	ppbv	ND	ND	ND	ND	0.30	0.10	5887396
Methyl Ethyl Ketone (2-Butanone)	ppbv	0.19	0.37	0.36	0.26	0.10	0.10	5889692
cis-1,2-Dichloroethylene	ppbv	ND	ND	ND	ND	0.050	0.050	5889692
trans-1,2-Dichloroethylene	ppbv	ND	ND	ND	ND	0.10	0.10	5889692
Methylene Chloride(Dichloromethane)	ppbv	0.136	0.193	0.149	0.153	0.050	0.050	5889692
Chloroform	ppbv	ND	ND	ND	ND	0.040	0.040	5889692
Carbon Tetrachloride	ppbv	0.149	0.124	0.141	0.157	0.050	0.050	5889692
1,1-Dichloroethane	ppbv	ND	ND	ND	ND	0.050	0.050	5889692
1,2-Dichloroethane	ppbv	0.033	0.033	0.032	0.034	0.010	0.010	5889692
Ethylene Dibromide	ppbv	ND	ND	ND	ND	0.010	0.010	5889692
1,1,1-Trichloroethane	ppbv	ND	ND	ND	ND	0.050	0.050	5889692
1,1,2-Trichloroethane	ppbv	ND	ND	ND	ND	0.012	0.012	5889692
1,1,2,2-Tetrachloroethane	ppbv	ND	ND	ND	ND	0.0027	0.0027	5889692
1,2-Dichloropropane	ppbv	ND	ND	ND	ND	0.050	0.050	5889692
Bromomethane	ppbv	ND	ND	ND	ND	0.050	0.050	5889692
Bromoform	ppbv	ND	ND	ND	ND	0.10	0.10	5889692
Bromodichloromethane	ppbv	ND	ND	ND	ND	0.20	0.10	5887396
Dibromochloromethane	ppbv	ND	ND	ND	ND	0.20	0.10	5887396
Trichloroethylene	ppbv	ND	ND	ND	ND	0.050	0.050	5889692
Tetrachloroethylene	ppbv	ND	ND	ND	ND	0.050	0.050	5889692
Benzene	ppbv	0.125	0.183	0.161	0.172	0.050	0.050	5889692
Toluene	ppbv	0.070	0.164	0.149	0.154	0.050	0.050	5889692
Ethylbenzene	ppbv	ND	ND	ND	ND	0.050	0.050	5889692
p+m-Xylene	ppbv	ND	ND	ND	ND	0.10	0.10	5889692
o-Xylene	ppbv	ND	ND	ND	ND	0.050	0.050	5889692
Styrene	ppbv	ND	ND	ND	ND	0.050	0.050	5889692
Chlorobenzene	ppbv	ND	ND	ND	ND	0.050	0.050	5889692
Cumene (Isopropylbenzene)	ppbv	ND	ND	ND	ND	0.50	0.10	5889702
Total Xylenes	ppbv	ND	ND	ND	ND	0.15	0.15	5889692
1,1,1,2-Tetrachloroethane	ppbv	ND	ND	ND	ND	0.021	0.021	5889692
Surrogate Recovery (%)								
Bromochloromethane	%	95	90	91	93			5889702
D5-Chlorobenzene	%	74	72	73	73			5889702

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		INN481	INN482	INN483	INN484			
Sampling Date		2018/12/07	2018/12/08	2018/12/08	2018/12/08			
COC Number		36819	36819	36819	36819			
	UNITS	**BEACH-DEC07**	**OPG-DEC08**	**COVE-DEC08**	**BEACH-DEC08**	**RDL**	**MDL**	**QC Batch**
Difluorobenzene	%	72	68	70	68			5889702
Bromochloromethane	%	95	90	91	93			5889692
D5-Chlorobenzene	%	74	72	73	73			5889692
Difluorobenzene	%	72	68	70	68			5889692
Bromochloromethane	%	95	90	91	93			5887396
D5-Chlorobenzene	%	74	72	73	73			5887396
Difluorobenzene	%	72	68	70	68			5887396

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8X2263
Report Date: 2018/12/19

RWDI Air Inc
Site Location: ST. MARYS

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		INN485			
Sampling Date					
COC Number		36819			
	UNITS	**BLANK**	**RDL**	**MDL**	**QC Batch**
2-Propanone	ppbv	ND	0.20	0.20	5889692
Chloromethane	ppbv	ND	0.30	0.10	5887396
Vinyl Chloride	ppbv	ND	0.020	0.020	5889692
Chloroethane	ppbv	ND	0.30	0.10	5887396
Methyl Ethyl Ketone (2-Butanone)	ppbv	ND	0.10	0.10	5889692
cis-1,2-Dichloroethylene	ppbv	ND	0.050	0.050	5889692
trans-1,2-Dichloroethylene	ppbv	ND	0.10	0.10	5889692
Methylene Chloride(Dichloromethane)	ppbv	ND	0.060	0.060	5889692
Chloroform	ppbv	ND	0.040	0.040	5889692
Carbon Tetrachloride	ppbv	ND	0.050	0.050	5889692
1,1-Dichloroethane	ppbv	ND	0.050	0.050	5889692
1,2-Dichloroethane	ppbv	ND	0.010	0.010	5889692
Ethylene Dibromide	ppbv	ND	0.010	0.010	5889692
1,1,1-Trichloroethane	ppbv	ND	0.050	0.050	5889692
1,1,2-Trichloroethane	ppbv	ND	0.012	0.012	5889692
1,1,2,2-Tetrachloroethane	ppbv	ND	0.0027	0.0027	5889692
1,2-Dichloropropane	ppbv	ND	0.050	0.050	5889692
Bromomethane	ppbv	ND	0.050	0.050	5889692
Bromoform	ppbv	ND	0.10	0.10	5889692
Bromodichloromethane	ppbv	ND	0.20	0.10	5887396
Dibromochloromethane	ppbv	ND	0.20	0.10	5887396
Trichloroethylene	ppbv	ND	0.050	0.050	5889692
Tetrachloroethylene	ppbv	ND	0.050	0.050	5889692
Benzene	ppbv	ND	0.050	0.050	5889692
Toluene	ppbv	ND	0.050	0.050	5889692
Ethylbenzene	ppbv	ND	0.050	0.050	5889692
p+m-Xylene	ppbv	ND	0.10	0.10	5889692
o-Xylene	ppbv	ND	0.050	0.050	5889692
Styrene	ppbv	ND	0.050	0.050	5889692
Chlorobenzene	ppbv	ND	0.050	0.050	5889692
Cumene (Isopropylbenzene)	ppbv	ND	0.50	0.10	5889702
Total Xylenes	ppbv	ND	0.15	0.15	5889692
1,1,1,2-Tetrachloroethane	ppbv	ND	0.021	0.021	5889692
Surrogate Recovery (%)					
Bromochloromethane	%	101			5889702
D5-Chlorobenzene	%	85			5889702

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B8X2263
Report Date: 2018/12/19

RWDI Air Inc
Site Location: ST. MARYS

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		INN485			
Sampling Date					
COC Number		36819			
	UNITS	**BLANK**	**RDL**	**MDL**	**QC Batch**
Difluorobenzene	%	87			5889702
Bromochloromethane	%	101			5889692
D5-Chlorobenzene	%	85			5889692
Difluorobenzene	%	87			5889692
Bromochloromethane	%	101			5887396
D5-Chlorobenzene	%	85			5887396
Difluorobenzene	%	87			5887396

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8X2263
Report Date: 2018/12/19

RWDI Air Inc
Site Location: ST. MARYS

TEST SUMMARY

Maxxam ID: INN471
Sample ID: OPG-DEC04
Matrix: Air

Collected: 2018/12/04
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5889698	N/A	2018/12/13	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5889702	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5889692	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5887396	N/A	2018/12/13	Jismon Mathew

Maxxam ID: INN471 Dup
Sample ID: OPG-DEC04
Matrix: Air

Collected: 2018/12/04
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Volatile Compounds in Air (SUMMA)	GC/MS	5889702	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5889692	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5887396	N/A	2018/12/13	Jismon Mathew

Maxxam ID: INN472
Sample ID: BEACH-DEC04
Matrix: Air

Collected: 2018/12/04
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5889698	N/A	2018/12/13	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5889702	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5889692	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5887396	N/A	2018/12/13	Jismon Mathew

Maxxam ID: INN473
Sample ID: COVE-DEC04
Matrix: Air

Collected: 2018/12/04
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5889698	N/A	2018/12/13	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5889702	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5889692	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5887396	N/A	2018/12/13	Jismon Mathew

Maxxam ID: INN474
Sample ID: OPG-DEC05
Matrix: Air

Collected: 2018/12/05
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5889698	N/A	2018/12/13	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5889702	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5889692	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5887396	N/A	2018/12/13	Jismon Mathew

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Maxxam Job #: B8X2263
Report Date: 2018/12/19

RWDI Air Inc
Site Location: ST. MARYS

TEST SUMMARY

Maxxam ID: INN475
Sample ID: COVE-DEC05
Matrix: Air

Collected: 2018/12/05
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5889698	N/A	2018/12/13	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5889702	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5889692	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5887396	N/A	2018/12/13	Jismon Mathew

Maxxam ID: INN476
Sample ID: OPG-DEC06
Matrix: Air

Collected: 2018/12/06
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5889698	N/A	2018/12/13	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5889702	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5889692	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5887396	N/A	2018/12/13	Jismon Mathew

Maxxam ID: INN477
Sample ID: COVE-DEC06
Matrix: Air

Collected: 2018/12/06
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5889698	N/A	2018/12/13	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5889702	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5889692	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5887396	N/A	2018/12/13	Jismon Mathew

Maxxam ID: INN478
Sample ID: BEACH-DEC06
Matrix: Air

Collected: 2018/12/06
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5889698	N/A	2018/12/13	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5889702	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5889692	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5887396	N/A	2018/12/13	Jismon Mathew

Maxxam ID: INN479
Sample ID: OPG-DEC07
Matrix: Air

Collected: 2018/12/07
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5889698	N/A	2018/12/13	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5889702	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5889692	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5887396	N/A	2018/12/13	Jismon Mathew

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TEST SUMMARY

Maxxam ID: INN480
Sample ID: COVE-DEC07
Matrix: Air

Collected: 2018/12/07
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5889698	N/A	2018/12/13	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5889702	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5889692	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5887396	N/A	2018/12/13	Jismon Mathew

Maxxam ID: INN481
Sample ID: BEACH-DEC07
Matrix: Air

Collected: 2018/12/07
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5889698	N/A	2018/12/13	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5889702	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5889692	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5887396	N/A	2018/12/13	Jismon Mathew

Maxxam ID: INN482
Sample ID: OPG-DEC08
Matrix: Air

Collected: 2018/12/08
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5889698	N/A	2018/12/13	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5889702	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5889692	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5887396	N/A	2018/12/13	Jismon Mathew

Maxxam ID: INN483
Sample ID: COVE-DEC08
Matrix: Air

Collected: 2018/12/08
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5889698	N/A	2018/12/13	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5889702	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5889692	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5887396	N/A	2018/12/13	Jismon Mathew

Maxxam ID: INN484
Sample ID: BEACH-DEC08
Matrix: Air

Collected: 2018/12/08
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5889698	N/A	2018/12/13	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5889702	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5889692	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5887396	N/A	2018/12/13	Jismon Mathew

Maxxam Job #: B8X2263
Report Date: 2018/12/19

RWDI Air Inc
Site Location: ST. MARYS

TEST SUMMARY

Maxxam ID: INN485
Sample ID: BLANK
Matrix: Air

Collected:
Shipped:
Received: 2018/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5889698	N/A	2018/12/13	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5889702	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5889692	N/A	2018/12/13	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5887396	N/A	2018/12/13	Jismon Mathew

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GENERAL COMMENTS

Results relate only to the items tested.

Maxxam Job #: B8X2263
Report Date: 2018/12/19

RWDI Air Inc
Site Location: ST. MARYS

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5887396	J-M	Spiked Blank	Bromochloromethane	2018/12/13		105	%	60 - 140
			D5-Chlorobenzene	2018/12/13		99	%	60 - 140
			Difluorobenzene	2018/12/13		99	%	60 - 140
			Chloromethane	2018/12/13		99	%	70 - 130
			Chloroethane	2018/12/13		101	%	70 - 130
			Bromodichloromethane	2018/12/13		120	%	70 - 130
			Dibromochloromethane	2018/12/13		113	%	70 - 130
5887396	J-M	Method Blank	Bromochloromethane	2018/12/13		102	%	60 - 140
			D5-Chlorobenzene	2018/12/13		85	%	60 - 140
			Difluorobenzene	2018/12/13		88	%	60 - 140
			Chloromethane	2018/12/13	ND, RDL=0.30		ppbv	
			Chloroethane	2018/12/13	ND, RDL=0.30		ppbv	
			Bromodichloromethane	2018/12/13	ND, RDL=0.20		ppbv	
			Dibromochloromethane	2018/12/13	ND, RDL=0.20		ppbv	
5887396	J-M	RPD - Sample/Sample Dup	Chloromethane	2018/12/13	1.8		%	25
			Chloroethane	2018/12/13	NC		%	25
			Bromodichloromethane	2018/12/13	NC		%	25
			Dibromochloromethane	2018/12/13	NC		%	25
5889692	J-M	Spiked Blank	2-Propanone	2018/12/13		104	%	70 - 130
			Bromochloromethane	2018/12/13		105	%	60 - 140
			D5-Chlorobenzene	2018/12/13		99	%	60 - 140
			Difluorobenzene	2018/12/13		99	%	60 - 140
			Vinyl Chloride	2018/12/13		91	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2018/12/13		111	%	70 - 130
			cis-1,2-Dichloroethylene	2018/12/13		94	%	70 - 130
			trans-1,2-Dichloroethylene	2018/12/13		102	%	70 - 130
			Methylene Chloride(Dichloromethane)	2018/12/13		97	%	70 - 130
			Chloroform	2018/12/13		101	%	70 - 130
			Carbon Tetrachloride	2018/12/13		110	%	70 - 130
			1,1-Dichloroethane	2018/12/13		99	%	70 - 130
			1,2-Dichloroethane	2018/12/13		106	%	70 - 130
			Ethylene Dibromide	2018/12/13		99	%	70 - 130
			1,1,1-Trichloroethane	2018/12/13		98	%	70 - 130
			1,1,2-Trichloroethane	2018/12/13		102	%	70 - 130
			1,1,2,2-Tetrachloroethane	2018/12/13		100	%	70 - 130
			1,2-Dichloropropane	2018/12/13		103	%	70 - 130
			Bromomethane	2018/12/13		100	%	70 - 130
			Bromoform	2018/12/13		108	%	70 - 130
			Trichloroethylene	2018/12/13		87	%	70 - 130
			Tetrachloroethylene	2018/12/13		84	%	70 - 130
			Benzene	2018/12/13		93	%	70 - 130
			Toluene	2018/12/13		96	%	70 - 130
			Ethylbenzene	2018/12/13		89	%	70 - 130
			p+m-Xylene	2018/12/13		90	%	70 - 130
			o-Xylene	2018/12/13		96	%	70 - 130
			Styrene	2018/12/13		85	%	70 - 130
			Chlorobenzene	2018/12/13		94	%	70 - 130
			Total Xylenes	2018/12/13		92	%	70 - 130
5889692	J-M	Method Blank	2-Propanone	2018/12/13	ND, RDL=0.20		ppbv	
			Bromochloromethane	2018/12/13		102	%	60 - 140

Maxxam Job #: B8X2263
Report Date: 2018/12/19

RWDI Air Inc
Site Location: ST. MARYS

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			D5-Chlorobenzene	2018/12/13		85	%	60 - 140
			Difluorobenzene	2018/12/13		88	%	60 - 140
			Vinyl Chloride	2018/12/13	ND, RDL=0.020		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2018/12/13	ND, RDL=0.10		ppbv	
			cis-1,2-Dichloroethylene	2018/12/13	ND, RDL=0.050		ppbv	
			trans-1,2-Dichloroethylene	2018/12/13	ND, RDL=0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2018/12/13	ND, RDL=0.050		ppbv	
			Chloroform	2018/12/13	ND, RDL=0.040		ppbv	
			Carbon Tetrachloride	2018/12/13	ND, RDL=0.050		ppbv	
			1,1-Dichloroethane	2018/12/13	ND, RDL=0.050		ppbv	
			1,2-Dichloroethane	2018/12/13	ND, RDL=0.010		ppbv	
			Ethylene Dibromide	2018/12/13	ND, RDL=0.010		ppbv	
			1,1,1-Trichloroethane	2018/12/13	ND, RDL=0.050		ppbv	
			1,1,2-Trichloroethane	2018/12/13	ND, RDL=0.012		ppbv	
			1,1,2,2-Tetrachloroethane	2018/12/13	ND, RDL=0.0027		ppbv	
			1,2-Dichloropropane	2018/12/13	ND, RDL=0.050		ppbv	
			Bromomethane	2018/12/13	ND, RDL=0.050		ppbv	
			Bromoform	2018/12/13	ND, RDL=0.10		ppbv	
			Trichloroethylene	2018/12/13	ND, RDL=0.050		ppbv	
			Tetrachloroethylene	2018/12/13	ND, RDL=0.050		ppbv	
			Benzene	2018/12/13	ND, RDL=0.050		ppbv	
			Toluene	2018/12/13	ND, RDL=0.050		ppbv	
			Ethylbenzene	2018/12/13	ND, RDL=0.050		ppbv	
			p+m-Xylene	2018/12/13	ND, RDL=0.10		ppbv	
			o-Xylene	2018/12/13	ND, RDL=0.050		ppbv	
			Styrene	2018/12/13	ND, RDL=0.050		ppbv	
			Chlorobenzene	2018/12/13	ND, RDL=0.050		ppbv	
			Total Xylenes	2018/12/13	ND, RDL=0.15		ppbv	
			1,1,1,2-Tetrachloroethane	2018/12/13	ND, RDL=0.021		ppbv	

Maxxam
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Maxxam Job #: B8X2263
Report Date: 2018/12/19

RWDI Air Inc
Site Location: ST. MARYS

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5889692	J-M	RPD - Sample/Sample Dup	2-Propanone	2018/12/13	NC		%	N/A
			Vinyl Chloride	2018/12/13	NC		%	25
			Methyl Ethyl Ketone (2-Butanone)	2018/12/13	5.7		%	25
			cis-1,2-Dichloroethylene	2018/12/13	NC		%	25
			trans-1,2-Dichloroethylene	2018/12/13	NC		%	25
			Methylene Chloride(Dichloromethane)	2018/12/13	0.95		%	25
			Chloroform	2018/12/13	NC		%	25
			Carbon Tetrachloride	2018/12/13	5.6		%	25
			1,1-Dichloroethane	2018/12/13	NC		%	25
			1,2-Dichloroethane	2018/12/13	0.54		%	25
			Ethylene Dibromide	2018/12/13	NC		%	25
			1,1,1-Trichloroethane	2018/12/13	NC		%	25
			1,1,2-Trichloroethane	2018/12/13	NC		%	25
			1,1,2,2-Tetrachloroethane	2018/12/13	NC		%	25
			1,2-Dichloropropane	2018/12/13	NC		%	25
			Bromomethane	2018/12/13	NC		%	25
			Bromoform	2018/12/13	NC		%	25
			Trichloroethylene	2018/12/13	NC		%	25
			Tetrachloroethylene	2018/12/13	NC		%	25
			Benzene	2018/12/13	3.2		%	25
			Toluene	2018/12/13	0.71		%	25
			Ethylbenzene	2018/12/13	NC		%	25
			p+m-Xylene	2018/12/13	NC		%	25
			o-Xylene	2018/12/13	NC		%	25
			Styrene	2018/12/13	2.3		%	25
			Chlorobenzene	2018/12/13	NC		%	25
			Total Xylenes	2018/12/13	NC		%	25
			1,1,1,2-Tetrachloroethane	2018/12/13	NC		%	25
5889702	J-M	Spiked Blank	Bromochloromethane	2018/12/13		105	%	60 - 140
			D5-Chlorobenzene	2018/12/13		99	%	60 - 140
			Difluorobenzene	2018/12/13		99	%	60 - 140
5889702	J-M	Method Blank	Bromochloromethane	2018/12/13		102	%	60 - 140
			D5-Chlorobenzene	2018/12/13		85	%	60 - 140
			Difluorobenzene	2018/12/13		88	%	60 - 140
			Cumene (Isopropylbenzene)	2018/12/13	ND, RDL=0.50		ppbv	
5889702	J-M	RPD - Sample/Sample Dup	Cumene (Isopropylbenzene)	2018/12/13	NC		%	25

N/A = Not Applicable

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

Maxxam Job #: B8X2263
Report Date: 2018/12/19

RWDI Air Inc
Site Location: ST. MARYS

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Maureen Smith

Maureen Smith, Supervisor, Volatiles

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

10-Dec-18 10:21
Clayton Johnson
B8X2263
KK4 AIR-001

n - Summa™ Canister 36819

Rd
io, L5N 2L8

Toll Free: 1-800-668-0639
Phone: (905) 817-5700
Fax: (905) 817-5777

CAM FCD-01302 /2 Page 1 of 1

Company Name: RWDI	**REPORT INFORMATION** Company Name: SAME
Contact Name: JOE FROST/KIRK CASTO	Project Manager:
Address: 600 SOUTHGATE DR GUELPH ON	Address:
E-mail: KIRK.CASTO@RWDI.COM	E-mail:
Ph:	Ph:
Sampled by: JDF	

ANALYSIS REQUESTED

Field Sample ID	Canister Serial #	Flow Regulator Serial #	Collection Date	START VACUUM (inches of Hg)	END VACUUM (inches of Hg)	SOIL VAPOUR	AMBIENT/INDOOR AIR	AMBIENT/COMMERCIAL/INDUSTRIAL	SUB-SLAB GAS	FULL LIST OF VOCs (reference TO15A) (TO14/15)	Aromatic/Aliphatic Hydrocarbon Fractions	F1 (C6-C10) and F2 (C10-C16)	Selected VOC's - please specify	Other				CANISTERS NOT USED
OPG-DEC04	2532		12/04	-28	-3					✓								
BEACH-DEC04	T-21631			-28	-3					✓								
COVE-DEC04	15282			-28	-3					✓								
OPG-DEC05	1260		12/05	-28	-					✓								
COVE-DEC05	14744			-28	-3					✓								
BEACH-DEC05	175			-28	-3					✓								
OPG-DEC06	23732		12/06	-28	-5					✓								
COVE-DEC06	7805			-28	-5					✓								
BEACH-DEC06	15150			-28	-5					✓								
OPG-DEC07	14749		12/07	-28	-5					✓								
COVE-DEC07	18281			-28	-5					✓								
BEACH-DEC07	29307			-28	-5					✓								

TAT Requirement
STD 10 Business day ☑
Rush 5 Business day * ☐
Rush 2 Business day * ☐
Rush Other * ☐
* need approval from Maxxam

PROJECT INFORMATION
Project #:
Name: ST. MARYS
PO #:
Maxxam Quote #:
Maxxam Contact:
Task Order/Line Item

REPORTING REQUIREMENTS
EDD ☐
Regulations ON 153 ☐
ON 419 ☐
BC CSR ☐
Other

Notes
1) please indicate on chain of custody if your samples are soil vapour or ambient air
2) please list all canisters on the chain of custody even if unused

PROJECT SPECIFIC COMMENTS
* PLEASE SEE KIRK CASTO'S LIST FOR ANALYSIS REFERENCE

Client Signature: [signature]
Date/Time: 12/10/18

Received by: [signature] HSHITHA SUKUMARA
Date/Time: 2018/12/10 10:21

PLEASE RETURN ALL UNUSED EQUIPMENT

5.3, 5.7, 6.2 °C

COC-1003 (11/2017)

10-Dec-18 10:21
Clayton Johnson
B8X2263
KK4 AIR-001

Chain of Custody – Summa™ Canister

36820

Maxxam
A Bureau Veritas Group Company

Toll Free: 1-800-668-0639
Phone: (905) 817-5700
Fax: (905) 817-5777

CAM FCD-01302 /2

Page 2 of 2

Company Name: RWDI	**REPORT INFORMATION** Company Name:
Contact Name: KIRK EASTO	Project Manager:
Address:	Address:
E-mail:	E-mail:
Ph:	Ph:
Sampled by:	

ANALYSIS REQUESTED

Field Sample ID	Canister Serial #	Flow Regulator Serial #	Collection Date	START VACUUM (inches of Hg)	END VACUUM (inches of Hg)	SOIL VAPOUR	AMBIENT/INDOOR AIR	AMBIENT/COMMERCIAL/INDUSTRIAL	SUB-SLAB GAS	FULL LIST OF VOCs (reference TO15A) (TO14/15)	Aromatic/Aliphatic Hydrocarbon Fractions	F1 (C6-C10) and F2 (C10-C16)	Selected VOC's - please specify	Other				CANISTERS NOT USED
OPG - DEC08	T-21673		12/08	-27	-5					✓								
COVE - DEC08	T-21755		↓	-27	-5					✓								
BEACH-DEC08	17180		↓	-27	-5					✓								
BLANK			N/A															

TAT Requirement

- STD 10 Business day ☑
- Rush 5 Business day * ☐
- Rush 2 Business day * ☐
- Rush Other * ☐

* need approval from Maxxam

PROJECT INFORMATION

Project #:
Name: ST. MARYS
PO #:
Maxxam Quote #:
Maxxam Contact:
Task Order/Line Item

REPORTING REQUIREMENTS

EDD ☐
Regulations: ON 153 ☐ ON 419 ☐ BC CSR ☐
Other

Notes

1) please indicate on chain of custody if your samples are soil vapour or ambient air
2) please list all canisters on the chain of custody even if unused

PROJECT SPECIFIC COMMENTS

Client Signature: [signature]
Date/Time: 12/10/2018

Received by: See Page 1
Date/Time:

PLEASE RETURN ALL UNUSED EQUIPMENT

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Maxxam's standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms which are available for viewing at www.maxxam.ca/terms.

COC-1003 (11/2017)

Your P.O. #: 1804600
Your Project #: 1804600
Site Location: ST MARYS AMBIENT
Your C.O.C. #: NA

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/10/26
Report #: R5457583
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8R1837
Received: 2018/10/15, 15:21

Sample Matrix: AIR
Samples Received: 10

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Canister Pressure (TO-15)	10	N/A	2018/10/18	BRL SOP-00304	EPA TO-15 m
Volatile Compounds in Air (SUMMA) (1)	10	N/A	2018/10/18	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air by GC/MS/SIM (2)	10	N/A	2018/10/18	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	10	N/A	2018/10/18	BRL SOP-00304	EPA TO-15 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam
A Bureau Veritas Group Company

Your P.O. #: 1804600
Your Project #: 1804600
Site Location: ST MARYS AMBIENT
Your C.O.C. #: NA

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/10/26
Report #: R5457583
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8R1837
Received: 2018/10/15, 15:21

(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Maxxam for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

(2) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Maxxam for a period of 5 calendar days from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B8R1837
Report Date: 2018/10/26

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

RESULTS OF ANALYSES OF AIR

Maxxam ID		IAG101	IAG102	IAG103	IAG104		
Sampling Date		2018/10/10	2018/10/10	2018/10/10	2018/10/11		
COC Number		NA	NA	NA	NA		
	UNITS	**OPG-OCTOBER 10**	**COVE-OCTOBER 10**	**BEACH-OCTOBER 10**	**OPG-OCTOBER 11**	**MDL**	**QC Batch**
Pressure on Receipt	psig	(-2.9)	(-3.3)	(-4.8)	(-2.9)		5791479
QC Batch = Quality Control Batch							

Maxxam ID		IAG105	IAG106	IAG107	IAG108		
Sampling Date		2018/10/11	2018/10/11	2018/10/12	2018/10/12		
COC Number		NA	NA	NA	NA		
	UNITS	**COVE-OCTOBER 11**	**BEACH-OCTOBER 11**	**OPG-OCTOBER 12**	**COVE-OCTOBER 12**	**MDL**	**QC Batch**
Pressure on Receipt	psig	(-3.0)	(-4.3)	(-2.5)	(-2.3)		5791479
QC Batch = Quality Control Batch							

Maxxam ID		IAG109	IAG110		
Sampling Date		2018/10/12			
COC Number		NA	NA		
	UNITS	**BEACH-OCTOBER 12**	**BLANK**	**MDL**	**QC Batch**
Pressure on Receipt	psig	(-2.6)	(-14.2)		5791479
QC Batch = Quality Control Batch					

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Maxxam Job #: B8R1837
Report Date: 2018/10/26

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		IAG101	IAG102	IAG103			
Sampling Date		2018/10/10	2018/10/10	2018/10/10			
COC Number		NA	NA	NA			
	UNITS	**OPG-OCTOBER 10**	**COVE-OCTOBER 10**	**BEACH-OCTOBER 10**	**RDL**	**MDL**	**QC Batch**
2-Propanone	ppbv	10.9	2.72	5.69	0.20	0.20	5801402
Chloromethane	ppbv	0.49	0.49	0.51	0.30	0.10	5793537
Vinyl Chloride	ppbv	ND	ND	ND	0.020	0.020	5801402
Chloroethane	ppbv	ND	ND	ND	0.30	0.10	5793537
Methyl Ethyl Ketone (2-Butanone)	ppbv	ND	ND	0.89	0.10	0.10	5801402
cis-1,2-Dichloroethylene	ppbv	ND	ND	ND	0.050	0.050	5801402
trans-1,2-Dichloroethylene	ppbv	ND	ND	ND	0.10	0.10	5801402
Methylene Chloride(Dichloromethane)	ppbv	0.130	0.125	0.137	0.050	0.050	5801402
Chloroform	ppbv	ND	ND	ND	0.040	0.040	5801402
Carbon Tetrachloride	ppbv	0.119	0.128	0.124	0.050	0.050	5801402
1,1-Dichloroethane	ppbv	ND	ND	ND	0.050	0.050	5801402
1,2-Dichloroethane	ppbv	0.015	0.013	0.015	0.010	0.010	5801402
Ethylene Dibromide	ppbv	ND	ND	ND	0.010	0.010	5801402
1,1,1-Trichloroethane	ppbv	ND	ND	ND	0.050	0.050	5801402
1,1,2-Trichloroethane	ppbv	ND	ND	ND	0.012	0.012	5801402
1,1,2,2-Tetrachloroethane	ppbv	ND	ND	ND	0.0027	0.0027	5801402
1,2-Dichloropropane	ppbv	ND	ND	ND	0.050	0.050	5801402
Bromomethane	ppbv	ND	ND	ND	0.050	0.050	5801402
Bromoform	ppbv	ND	ND	ND	0.10	0.10	5801402
Bromodichloromethane	ppbv	ND	ND	ND	0.20	0.10	5793537
Dibromochloromethane	ppbv	ND	ND	ND	0.20	0.10	5793537
Trichloroethylene	ppbv	ND	ND	ND	0.050	0.050	5801402
Tetrachloroethylene	ppbv	ND	ND	ND	0.050	0.050	5801402
Benzene	ppbv	0.144	0.084	0.194	0.050	0.050	5801402
Toluene	ppbv	0.242	0.256	0.330	0.050	0.050	5801402
Ethylbenzene	ppbv	ND	ND	ND	0.050	0.050	5801402
p+m-Xylene	ppbv	0.16	ND	ND	0.10	0.10	5801402
o-Xylene	ppbv	ND	ND	ND	0.050	0.050	5801402
Styrene	ppbv	ND	ND	ND	0.050	0.050	5801402
Chlorobenzene	ppbv	ND	ND	ND	0.050	0.050	5801402
Cumene (Isopropylbenzene)	ppbv	ND	ND	ND	0.50	0.10	5802345
Total Xylenes	ppbv	0.16	ND	ND	0.15	0.15	5801402
1,1,1,2-Tetrachloroethane	ppbv	ND	ND	ND	0.021	0.021	5801402

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B8R1837
Report Date: 2018/10/26

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		IAG101	IAG102	IAG103			
Sampling Date		2018/10/10	2018/10/10	2018/10/10			
COC Number		NA	NA	NA			
	UNITS	**OPG-OCTOBER 10**	**COVE-OCTOBER 10**	**BEACH-OCTOBER 10**	**RDL**	**MDL**	**QC Batch**
Surrogate Recovery (%)							
Bromochloromethane	%	90	90	87			5802345
D5-Chlorobenzene	%	79	74	81			5802345
Difluorobenzene	%	80	77	79			5802345
Bromochloromethane	%	90	90	87			5801402
D5-Chlorobenzene	%	79	74	81			5801402
Difluorobenzene	%	80	77	79			5801402
Bromochloromethane	%	90	90	87			5793537
D5-Chlorobenzene	%	79	74	81			5793537
Difluorobenzene	%	80	77	79			5793537

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8R1837
Report Date: 2018/10/26

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		IAG104	IAG105	IAG106			
Sampling Date		2018/10/11	2018/10/11	2018/10/11			
COC Number		NA	NA	NA			
	UNITS	**OPG-OCTOBER 11**	**COVE-OCTOBER 11**	**BEACH-OCTOBER 11**	**RDL**	**MDL**	**QC Batch**
2-Propanone	ppbv	2.64	1.33	2.20	0.20	0.20	5801402
Chloromethane	ppbv	0.47	0.45	0.46	0.30	0.10	5793537
Vinyl Chloride	ppbv	ND	ND	ND	0.020	0.020	5801402
Chloroethane	ppbv	ND	ND	ND	0.30	0.10	5793537
Methyl Ethyl Ketone (2-Butanone)	ppbv	ND	ND	ND	1.0	1.0	5801402
cis-1,2-Dichloroethylene	ppbv	ND	ND	ND	0.050	0.050	5801402
trans-1,2-Dichloroethylene	ppbv	ND	ND	ND	0.10	0.10	5801402
Methylene Chloride(Dichloromethane)	ppbv	0.117	0.113	0.108	0.050	0.050	5801402
Chloroform	ppbv	ND	ND	ND	0.040	0.040	5801402
Carbon Tetrachloride	ppbv	0.131	0.134	0.132	0.050	0.050	5801402
1,1-Dichloroethane	ppbv	ND	ND	ND	0.050	0.050	5801402
1,2-Dichloroethane	ppbv	0.017	0.016	0.016	0.010	0.010	5801402
Ethylene Dibromide	ppbv	ND	ND	ND	0.010	0.010	5801402
1,1,1-Trichloroethane	ppbv	ND	ND	ND	0.050	0.050	5801402
1,1,2-Trichloroethane	ppbv	ND	ND	ND	0.012	0.012	5801402
1,1,2,2-Tetrachloroethane	ppbv	ND	ND	ND	0.0027	0.0027	5801402
1,2-Dichloropropane	ppbv	0.060	ND	0.064	0.050	0.050	5801402
Bromomethane	ppbv	ND	ND	ND	0.050	0.050	5801402
Bromoform	ppbv	ND	ND	ND	0.10	0.10	5801402
Bromodichloromethane	ppbv	ND	ND	ND	0.20	0.10	5793537
Dibromochloromethane	ppbv	ND	ND	ND	0.20	0.10	5793537
Trichloroethylene	ppbv	ND	ND	ND	0.050	0.050	5801402
Tetrachloroethylene	ppbv	0.198	ND	ND	0.050	0.050	5801402
Benzene	ppbv	0.069	0.074	0.074	0.050	0.050	5801402
Toluene	ppbv	0.148	0.147	0.105	0.050	0.050	5801402
Ethylbenzene	ppbv	ND	ND	ND	0.050	0.050	5801402
p+m-Xylene	ppbv	ND	ND	ND	0.10	0.10	5801402
o-Xylene	ppbv	ND	ND	ND	0.050	0.050	5801402
Styrene	ppbv	ND	ND	ND	0.050	0.050	5801402
Chlorobenzene	ppbv	ND	ND	ND	0.050	0.050	5801402
Cumene (Isopropylbenzene)	ppbv	ND	ND	ND	0.50	0.10	5802345
Total Xylenes	ppbv	ND	ND	ND	0.15	0.15	5801402
1,1,1,2-Tetrachloroethane	ppbv	ND	ND	ND	0.021	0.021	5801402

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Maxxam Job #: B8R1837
Report Date: 2018/10/26

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		IAG104	IAG105	IAG106			
Sampling Date		2018/10/11	2018/10/11	2018/10/11			
COC Number		NA	NA	NA			
	UNITS	**OPG-OCTOBER 11**	**COVE-OCTOBER 11**	**BEACH-OCTOBER 11**	**RDL**	**MDL**	**QC Batch**
Surrogate Recovery (%)							
Bromochloromethane	%	86	86	87			5802345
D5-Chlorobenzene	%	73	74	73			5802345
Difluorobenzene	%	73	73	75			5802345
Bromochloromethane	%	86	86	87			5801402
D5-Chlorobenzene	%	73	74	73			5801402
Difluorobenzene	%	73	73	75			5801402
Bromochloromethane	%	86	86	87			5793537
D5-Chlorobenzene	%	73	74	73			5793537
Difluorobenzene	%	73	73	75			5793537

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8R1837
Report Date: 2018/10/26

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		IAG107			IAG108			
Sampling Date		2018/10/12			2018/10/12			
COC Number		NA			NA			
	UNITS	**OPG-OCTOBER 12**	**RDL**	**MDL**	**COVE-OCTOBER 12**	**RDL**	**MDL**	**QC Batch**
2-Propanone	ppbv	1.44	0.20	0.20	1.84	0.20	0.20	5801402
Chloromethane	ppbv	0.46	0.30	0.10	0.46	0.30	0.10	5793537
Vinyl Chloride	ppbv	ND	0.020	0.020	ND	0.020	0.020	5801402
Chloroethane	ppbv	ND	0.30	0.10	ND	0.30	0.10	5793537
Methyl Ethyl Ketone (2-Butanone)	ppbv	ND	1.0	1.0	ND	0.10	0.10	5801402
cis-1,2-Dichloroethylene	ppbv	ND	0.050	0.050	ND	0.050	0.050	5801402
trans-1,2-Dichloroethylene	ppbv	ND	0.10	0.10	ND	0.10	0.10	5801402
Methylene Chloride(Dichloromethane)	ppbv	0.132	0.050	0.050	0.197	0.050	0.050	5801402
Chloroform	ppbv	ND	0.040	0.040	ND	0.040	0.040	5801402
Carbon Tetrachloride	ppbv	0.138	0.050	0.050	0.136	0.050	0.050	5801402
1,1-Dichloroethane	ppbv	ND	0.050	0.050	ND	0.050	0.050	5801402
1,2-Dichloroethane	ppbv	0.016	0.010	0.010	0.015	0.010	0.010	5801402
Ethylene Dibromide	ppbv	ND	0.010	0.010	ND	0.010	0.010	5801402
1,1,1-Trichloroethane	ppbv	ND	0.050	0.050	ND	0.050	0.050	5801402
1,1,2-Trichloroethane	ppbv	ND	0.012	0.012	ND	0.012	0.012	5801402
1,1,2,2-Tetrachloroethane	ppbv	ND	0.0027	0.0027	ND	0.0027	0.0027	5801402
1,2-Dichloropropane	ppbv	ND	0.050	0.050	ND	0.050	0.050	5801402
Bromomethane	ppbv	ND	0.050	0.050	ND	0.050	0.050	5801402
Bromoform	ppbv	ND	0.10	0.10	ND	0.10	0.10	5801402
Bromodichloromethane	ppbv	ND	0.20	0.10	ND	0.20	0.10	5793537
Dibromochloromethane	ppbv	ND	0.20	0.10	ND	0.20	0.10	5793537
Trichloroethylene	ppbv	ND	0.050	0.050	ND	0.050	0.050	5801402
Tetrachloroethylene	ppbv	ND	0.050	0.050	ND	0.050	0.050	5801402
Benzene	ppbv	0.072	0.050	0.050	0.068	0.050	0.050	5801402
Toluene	ppbv	0.103	0.050	0.050	0.159	0.050	0.050	5801402
Ethylbenzene	ppbv	ND	0.050	0.050	ND	0.050	0.050	5801402
p+m-Xylene	ppbv	ND	0.10	0.10	ND	0.10	0.10	5801402
o-Xylene	ppbv	ND	0.050	0.050	ND	0.050	0.050	5801402
Styrene	ppbv	ND	0.050	0.050	ND	0.050	0.050	5801402
Chlorobenzene	ppbv	ND	0.050	0.050	ND	0.050	0.050	5801402
Cumene (Isopropylbenzene)	ppbv	ND	0.50	0.10	ND	0.50	0.10	5802345
Total Xylenes	ppbv	ND	0.15	0.15	ND	0.15	0.15	5801402
1,1,1,2-Tetrachloroethane	ppbv	ND	0.021	0.021	ND	0.021	0.021	5801402

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B8R1837
Report Date: 2018/10/26

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		IAG107			IAG108			
Sampling Date		2018/10/12			2018/10/12			
COC Number		NA			NA			
	UNITS	**OPG-OCTOBER 12**	**RDL**	**MDL**	**COVE-OCTOBER 12**	**RDL**	**MDL**	**QC Batch**
Surrogate Recovery (%)								
Bromochloromethane	%	88			88			5802345
D5-Chlorobenzene	%	74			74			5802345
Difluorobenzene	%	75			74			5802345
Bromochloromethane	%	88			88			5801402
D5-Chlorobenzene	%	74			74			5801402
Difluorobenzene	%	75			74			5801402
Bromochloromethane	%	88			88			5793537
D5-Chlorobenzene	%	74			74			5793537
Difluorobenzene	%	75			74			5793537

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8R1837
Report Date: 2018/10/26

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		IAG109	IAG110			
Sampling Date		2018/10/12				
COC Number		NA	NA			
	UNITS	**BEACH-OCTOBER 12**	**BLANK**	**RDL**	**MDL**	**QC Batch**
2-Propanone	ppbv	3.46	ND	0.20	0.20	5801402
Chloromethane	ppbv	0.47	ND	0.30	0.10	5793537
Vinyl Chloride	ppbv	ND	ND	0.020	0.020	5801402
Chloroethane	ppbv	ND	ND	0.30	0.10	5793537
Methyl Ethyl Ketone (2-Butanone)	ppbv	ND	ND	0.10	0.10	5801402
cis-1,2-Dichloroethylene	ppbv	ND	ND	0.050	0.050	5801402
trans-1,2-Dichloroethylene	ppbv	ND	ND	0.10	0.10	5801402
Methylene Chloride(Dichloromethane)	ppbv	0.318	ND	0.050	0.050	5801402
Chloroform	ppbv	ND	ND	0.040	0.040	5801402
Carbon Tetrachloride	ppbv	0.126	ND	0.050	0.050	5801402
1,1-Dichloroethane	ppbv	ND	ND	0.050	0.050	5801402
1,2-Dichloroethane	ppbv	0.017	ND	0.010	0.010	5801402
Ethylene Dibromide	ppbv	ND	ND	0.010	0.010	5801402
1,1,1-Trichloroethane	ppbv	ND	ND	0.050	0.050	5801402
1,1,2-Trichloroethane	ppbv	ND	ND	0.012	0.012	5801402
1,1,2,2-Tetrachloroethane	ppbv	ND	ND	0.0027	0.0027	5801402
1,2-Dichloropropane	ppbv	0.086	ND	0.050	0.050	5801402
Bromomethane	ppbv	ND	ND	0.050	0.050	5801402
Bromoform	ppbv	ND	ND	0.10	0.10	5801402
Bromodichloromethane	ppbv	ND	ND	0.20	0.10	5793537
Dibromochloromethane	ppbv	ND	ND	0.20	0.10	5793537
Trichloroethylene	ppbv	ND	ND	0.050	0.050	5801402
Tetrachloroethylene	ppbv	ND	ND	0.050	0.050	5801402
Benzene	ppbv	0.130	ND	0.050	0.050	5801402
Toluene	ppbv	0.190	ND	0.050	0.050	5801402
Ethylbenzene	ppbv	ND	ND	0.050	0.050	5801402
p+m-Xylene	ppbv	ND	ND	0.10	0.10	5801402
o-Xylene	ppbv	ND	ND	0.050	0.050	5801402
Styrene	ppbv	ND	ND	0.050	0.050	5801402
Chlorobenzene	ppbv	ND	ND	0.050	0.050	5801402
Cumene (Isopropylbenzene)	ppbv	ND	ND	0.50	0.10	5802345
Total Xylenes	ppbv	ND	ND	0.15	0.15	5801402
1,1,1,2-Tetrachloroethane	ppbv	ND	ND	0.021	0.021	5801402

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B8R1837
Report Date: 2018/10/26

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		IAG109	IAG110			
Sampling Date		2018/10/12				
COC Number		NA	NA			
	UNITS	**BEACH-OCTOBER 12**	**BLANK**	**RDL**	**MDL**	**QC Batch**
Surrogate Recovery (%)						
Bromochloromethane	%	87	88			5802345
D5-Chlorobenzene	%	73	60			5802345
Difluorobenzene	%	77	64			5802345
Bromochloromethane	%	87	88			5801402
D5-Chlorobenzene	%	73	60			5801402
Difluorobenzene	%	77	64			5801402
Bromochloromethane	%	87	88			5793537
D5-Chlorobenzene	%	73	60			5793537
Difluorobenzene	%	77	64			5793537

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8R1837
Report Date: 2018/10/26

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

TEST SUMMARY

Maxxam ID: IAG101
Sample ID: OPG-OCTOBER 10
Matrix: AIR

Collected: 2018/10/10
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5791479	N/A	2018/10/18	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5802345	N/A	2018/10/18	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5801402	N/A	2018/10/18	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5793537	N/A	2018/10/18	Jismon Mathew

Maxxam ID: IAG102
Sample ID: COVE-OCTOBER 10
Matrix: AIR

Collected: 2018/10/10
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5791479	N/A	2018/10/18	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5802345	N/A	2018/10/18	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5801402	N/A	2018/10/18	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5793537	N/A	2018/10/18	Jismon Mathew

Maxxam ID: IAG103
Sample ID: BEACH-OCTOBER 10
Matrix: AIR

Collected: 2018/10/10
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5791479	N/A	2018/10/18	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5802345	N/A	2018/10/18	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5801402	N/A	2018/10/18	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5793537	N/A	2018/10/18	Jismon Mathew

Maxxam ID: IAG104
Sample ID: OPG-OCTOBER 11
Matrix: AIR

Collected: 2018/10/11
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5791479	N/A	2018/10/18	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5802345	N/A	2018/10/18	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5801402	N/A	2018/10/18	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5793537	N/A	2018/10/18	Jismon Mathew

Maxxam ID: IAG105
Sample ID: COVE-OCTOBER 11
Matrix: AIR

Collected: 2018/10/11
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5791479	N/A	2018/10/18	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5802345	N/A	2018/10/18	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5801402	N/A	2018/10/18	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5793537	N/A	2018/10/18	Jismon Mathew

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Maxxam Job #: B8R1837
Report Date: 2018/10/26

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

TEST SUMMARY

Maxxam ID: IAG106
Sample ID: BEACH-OCTOBER 11
Matrix: AIR

Collected: 2018/10/11
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5791479	N/A	2018/10/18	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5802345	N/A	2018/10/18	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5801402	N/A	2018/10/18	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5793537	N/A	2018/10/18	Jismon Mathew

Maxxam ID: IAG107
Sample ID: OPG-OCTOBER 12
Matrix: AIR

Collected: 2018/10/12
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5791479	N/A	2018/10/18	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5802345	N/A	2018/10/18	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5801402	N/A	2018/10/18	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5793537	N/A	2018/10/18	Jismon Mathew

Maxxam ID: IAG108
Sample ID: COVE-OCTOBER 12
Matrix: AIR

Collected: 2018/10/12
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5791479	N/A	2018/10/18	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5802345	N/A	2018/10/18	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5801402	N/A	2018/10/18	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5793537	N/A	2018/10/18	Jismon Mathew

Maxxam ID: IAG109
Sample ID: BEACH-OCTOBER 12
Matrix: AIR

Collected: 2018/10/12
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5791479	N/A	2018/10/18	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5802345	N/A	2018/10/18	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5801402	N/A	2018/10/18	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5793537	N/A	2018/10/18	Jismon Mathew

Maxxam ID: IAG110
Sample ID: BLANK
Matrix: AIR

Collected:
Shipped:
Received: 2018/10/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5791479	N/A	2018/10/18	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5802345	N/A	2018/10/18	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5801402	N/A	2018/10/18	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5793537	N/A	2018/10/18	Jismon Mathew

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GENERAL COMMENTS

Sample IAG104 [OPG-OCTOBER 11] : Increased DL for 2-Butanone due to interference

Sample IAG105 [COVE-OCTOBER 11] : Increased DL for 2-Butanone due to interference

Sample IAG106 [BEACH-OCTOBER 11] : Increased DL for 2-Butanone due to interference

Sample IAG107 [OPG-OCTOBER 12] : Increased DL for 2-Butanone due to interference

Results relate only to the items tested.

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Maxxam Job #: B8R1837
Report Date: 2018/10/26

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5793537	J-M	Spiked Blank	Bromochloromethane	2018/10/18		107	%	60 - 140
			D5-Chlorobenzene	2018/10/18		106	%	60 - 140
			Difluorobenzene	2018/10/18		111	%	60 - 140
			Chloromethane	2018/10/18		91	%	70 - 130
			Chloroethane	2018/10/18		96	%	70 - 130
			Bromodichloromethane	2018/10/18		104	%	70 - 130
			Dibromochloromethane	2018/10/18		109	%	70 - 130
5793537	J-M	Method Blank	Bromochloromethane	2018/10/18		94	%	60 - 140
			D5-Chlorobenzene	2018/10/18		71	%	60 - 140
			Difluorobenzene	2018/10/18		79	%	60 - 140
			Chloromethane	2018/10/18	ND, RDL=0.30		ppbv	
			Chloroethane	2018/10/18	ND, RDL=0.30		ppbv	
			Bromodichloromethane	2018/10/18	ND, RDL=0.20		ppbv	
			Dibromochloromethane	2018/10/18	ND, RDL=0.20		ppbv	
5793537	J-M	RPD - Sample/Sample Dup	Chloromethane	2018/10/18	4.1		%	25
			Chloroethane	2018/10/18	NC		%	25
			Bromodichloromethane	2018/10/18	NC		%	25
			Dibromochloromethane	2018/10/18	NC		%	25
5801402	J-M	Spiked Blank	2-Propanone	2018/10/18		94	%	70 - 130
			Bromochloromethane	2018/10/18		107	%	60 - 140
			D5-Chlorobenzene	2018/10/18		106	%	60 - 140
			Difluorobenzene	2018/10/18		111	%	60 - 140
			Vinyl Chloride	2018/10/18		90	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2018/10/18		105	%	70 - 130
			cis-1,2-Dichloroethylene	2018/10/18		94	%	70 - 130
			trans-1,2-Dichloroethylene	2018/10/18		97	%	70 - 130
			Methylene Chloride(Dichloromethane)	2018/10/18		90	%	70 - 130
			Chloroform	2018/10/18		95	%	70 - 130
			Carbon Tetrachloride	2018/10/18		101	%	70 - 130
			1,1-Dichloroethane	2018/10/18		94	%	70 - 130
			1,2-Dichloroethane	2018/10/18		92	%	70 - 130
			Ethylene Dibromide	2018/10/18		103	%	70 - 130
			1,1,1-Trichloroethane	2018/10/18		90	%	70 - 130
			1,1,2-Trichloroethane	2018/10/18		102	%	70 - 130
			1,1,2,2-Tetrachloroethane	2018/10/18		99	%	70 - 130
			1,2-Dichloropropane	2018/10/18		104	%	70 - 130
			Bromomethane	2018/10/18		98	%	70 - 130
			Bromoform	2018/10/18		111	%	70 - 130
			Trichloroethylene	2018/10/18		97	%	70 - 130
			Tetrachloroethylene	2018/10/18		99	%	70 - 130
			Benzene	2018/10/18		104	%	70 - 130
			Toluene	2018/10/18		110	%	70 - 130
			Ethylbenzene	2018/10/18		107	%	70 - 130
			p+m-Xylene	2018/10/18		107	%	70 - 130
			o-Xylene	2018/10/18		112	%	70 - 130
			Styrene	2018/10/18		110	%	70 - 130
			Chlorobenzene	2018/10/18		104	%	70 - 130

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Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B8R1837
Report Date: 2018/10/26

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Total Xylenes	2018/10/18		109	%	70 - 130
5801402	J-M	Method Blank	2-Propanone	2018/10/18	ND, RDL=0.20		ppbv	
			Bromochloromethane	2018/10/18		94	%	60 - 140
			D5-Chlorobenzene	2018/10/18		71	%	60 - 140
			Difluorobenzene	2018/10/18		79	%	60 - 140
			Vinyl Chloride	2018/10/18	ND, RDL=0.020		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2018/10/18	ND, RDL=0.10		ppbv	
			cis-1,2-Dichloroethylene	2018/10/18	ND, RDL=0.050		ppbv	
			trans-1,2-Dichloroethylene	2018/10/18	ND, RDL=0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2018/10/18	ND, RDL=0.050		ppbv	
			Chloroform	2018/10/18	ND, RDL=0.040		ppbv	
			Carbon Tetrachloride	2018/10/18	ND, RDL=0.050		ppbv	
			1,1-Dichloroethane	2018/10/18	ND, RDL=0.050		ppbv	
			1,2-Dichloroethane	2018/10/18	ND, RDL=0.010		ppbv	
			Ethylene Dibromide	2018/10/18	ND, RDL=0.010		ppbv	
			1,1,1-Trichloroethane	2018/10/18	ND, RDL=0.050		ppbv	
			1,1,2-Trichloroethane	2018/10/18	ND, RDL=0.012		ppbv	
			1,1,2,2-Tetrachloroethane	2018/10/18	ND, RDL=0.0027		ppbv	
			1,2-Dichloropropane	2018/10/18	ND, RDL=0.050		ppbv	
			Bromomethane	2018/10/18	ND, RDL=0.050		ppbv	
			Bromoform	2018/10/18	ND, RDL=0.10		ppbv	
			Trichloroethylene	2018/10/18	ND, RDL=0.050		ppbv	
			Tetrachloroethylene	2018/10/18	ND, RDL=0.050		ppbv	
			Benzene	2018/10/18	ND, RDL=0.050		ppbv	
			Toluene	2018/10/18	ND, RDL=0.050		ppbv	
			Ethylbenzene	2018/10/18	ND, RDL=0.050		ppbv	
			p+m-Xylene	2018/10/18	ND, RDL=0.10		ppbv	

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Maxxam A Bureau Veritas Group Company

Maxxam Job #: B8R1837
Report Date: 2018/10/26

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			o-Xylene	2018/10/18	ND, RDL=0.050		ppbv	
			Styrene	2018/10/18	ND, RDL=0.050		ppbv	
			Chlorobenzene	2018/10/18	ND, RDL=0.050		ppbv	
			Total Xylenes	2018/10/18	ND, RDL=0.15		ppbv	
			1,1,1,2-Tetrachloroethane	2018/10/18	ND, RDL=0.021		ppbv	
5801402	J-M	RPD - Sample/Sample Dup	2-Propanone	2018/10/18	NC		%	N/A
			Vinyl Chloride	2018/10/18	NC		%	25
			Methyl Ethyl Ketone (2-Butanone)	2018/10/18	1.0		%	25
			cis-1,2-Dichloroethylene	2018/10/18	NC		%	25
			trans-1,2-Dichloroethylene	2018/10/18	NC		%	25
			Methylene Chloride(Dichloromethane)	2018/10/18	8.7		%	25
			Chloroform	2018/10/18	NC		%	25
			Carbon Tetrachloride	2018/10/18	5.3		%	25
			1,1-Dichloroethane	2018/10/18	NC		%	25
			1,2-Dichloroethane	2018/10/18	2.2		%	25
			Ethylene Dibromide	2018/10/18	NC		%	25
			1,1,1-Trichloroethane	2018/10/18	NC		%	25
			1,1,2-Trichloroethane	2018/10/18	NC		%	25
			1,1,2,2-Tetrachloroethane	2018/10/18	NC		%	25
			1,2-Dichloropropane	2018/10/18	NC		%	25
			Bromomethane	2018/10/18	NC		%	25
			Bromoform	2018/10/18	NC		%	25
			Trichloroethylene	2018/10/18	7.0		%	25
			Tetrachloroethylene	2018/10/18	NC		%	25
			Benzene	2018/10/18	3.2		%	25
			Toluene	2018/10/18	11		%	25
			Ethylbenzene	2018/10/18	NC		%	25
			p+m-Xylene	2018/10/18	NC		%	25
			o-Xylene	2018/10/18	NC		%	25
			Styrene	2018/10/18	NC		%	25
			Chlorobenzene	2018/10/18	NC		%	25
			Total Xylenes	2018/10/18	NC		%	25
			1,1,1,2-Tetrachloroethane	2018/10/18	NC		%	25
5802345	J-M	Spiked Blank	Bromochloromethane	2018/10/18		107	%	60 - 140
			D5-Chlorobenzene	2018/10/18		106	%	60 - 140
			Difluorobenzene	2018/10/18		111	%	60 - 140
5802345	J-M	Method Blank	Bromochloromethane	2018/10/18		94	%	60 - 140
			D5-Chlorobenzene	2018/10/18		71	%	60 - 140
			Difluorobenzene	2018/10/18		79	%	60 - 140

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Cumene (Isopropylbenzene)	2018/10/18	ND, RDL=0.50		ppbv	

N/A = Not Applicable

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

Maxxam Job #: B8R1837
Report Date: 2018/10/26

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Maureen Smith

Maureen Smith, Supervisor, Volatiles

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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15-Oct-18 15:21
Clayton Johnson
B8R1837
KK4 AIR-001

...orm - Summa™ Canister

...ampobello Rd
...sauga Ontario ,L5N 2L8
...naxxam.ca

Toll Free: 1-800-668-0639
Phone: (905) 817-5700
Fax: (905) 817-5777

CAM FCD-01302 /2 Page ___ of ___

Company Name: RWDI	
Contact Name Kirk Easto	
Address: 600 Southgate Drive	
E-mail: kirk.easto@rwdi.com	
Ph:	
Sampled by: JDF	

REPORT INFORMATION

Company Name: SAME	
Project Manager:	
Address:	
E-mail:	
Ph:	

ANALYSIS REQUESTED

Field Sample ID	Canister Serial #	Flow Regulator Serial #	Collection Date	START VACUUM (inches of Hg)	END VACUUM (inches of Hg)	SOIL VAPOUR	AMBIENT/INDOOR AIR	AMBIENT/COMMERCIAL/INDUSTRIAL	SUB-SLAB GAS	FULL LIST OF VOCs (reference TO15A)	Aromatic/Aliphatic Hydrocarbon Fractions	F1 (C6-C10) and F2 (C10-C16)	Selected VOC's - please specify	Other				CANISTERS NOT USED
OPG - October 10	12959	FX1357	2018/10/10	-28	-5			A		x								
Cove - October 10	18200	FX1403	2018/10/10	-29	-6			A		x								
Beach - October 10	18187	FX1314	2018/10/10	-28	-9			A		x								
OPG - October 11	11614	FX1357	2018/10/11					A		x								
Cove - October 11	18182	FX1403	2018/10/11					A		x								
Beach - October 11	17999	FX1314	2018/10/11					A		x								
OPG - October 12	1578	FX1357	2018/10/12					A		x								
Cove - October 12	1617	FX1403	2018/10/12					A		x								
Beach - October 12	11355	FX1314	2018/10/12					A		x								
BLANK	23477									x								

TAT Requirement

- STD 10 Business day ☑
- Rush 5 Business day * ☐
- Rush 2 Business day * ☐
- Rush Other * ☐

* need approval from Maxxam

PROJECT INFORMATION

Project #: 1804600
Name: St Marys Ambient
PO #: 1804600
Maxxam Quote #:
Maxxam Contact:
Task Order/Line Item

REPORTING REQUIREMENTS

EDD ☐
Regulations ON 153 ☐
ON 419 ☐
BC CSR ☐
Other

Notes

1) please indicate on chain of custody if your samples are soil vapour or ambient air
2) please list all canisters on the chain of custody even if unused

PROJECT SPECIFIC COMMENTS

See parameter list from Kirk Easto

Client Signature:
Date/Time:

Received by: [signature]
Date/Time: 2018/10/15 15:21

PLEASE RETURN ALL UNUSED EQUIPMENT

Chain of Custody Form - AIR

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Mississauga Ontario ,L5N 2L8
www.maxxamanalytics.com

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Phone: (905) 817-5700
Fax: (905) 817-5777

CAM FCD-01302 /2 Page ____ of ____

ANALYSIS REQUESTED

CLIENT INFORMATION SECTION

Company Name: RWDI
Project Manager: Kirk Easto
e-mail: kirk.easto@rwdi.com
Address: 600 Southgate Dr. Gielph, ON

Phone: (519) 823-1311 Fax:

Sampled by: JDF

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time	NIOSH Method 6009 (Hg)												
OPG - October 10 (2 samples)		1L/M	2018/10/10	24 hrs	x												
Cove - October 10 (2 samples)		1L/M	2018/10/10	24 hrs	x												
Beach - October 10 (2 samples)		1L/M	2018/10/10	24 hrs	x												
OPG - October 11 (2 samples)		1L/M	2018/10/11	24 hrs	x												
Cove - October 11 (2 samples)		1L/M	2018/10/11	24 hrs	x												
Beach - October 11 (2 samples)		1L/M	2018/10/11	24 hrs	x												
OPG - October 12 (2 samples)		1L/M	2018/10/12	24 hrs	x												
Cove - October 12 (2 samples)		1L/M	2018/10/12	24 hrs	x												
Beach - October 12 (2 samples)		1L/M	2018/10/12	24 hrs	x												
Hg Tubes - BLANK					x												

TAT Requirement

STD 10 Business day ☑
Rush 5 Business day * ☐
Rush 2 Business day * ☐
* need approval from Maxxam

PROJECT INFORMATION

Project #: 1804600
Name: St Marys Ambient
PO #: 1804600
Maxxam Quote #:
Maxxam Contact:

REPORTING REQUIREMENTS

Summary Report only ☐
EDD ☐

Regulation

Notes
Please note if this samples are "Industrial Hygiene" samples

PROJECT SPECIFIC COMMENTS

Client Signature: Joe Frost
Affiliation: Env Tech
Date/Time: 2018/10/15

Received by: [signature]
Affiliation:
Date/Time: 2018/10/15 15:21

Chain of Custody Form - AIR

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Phone: (905) 817-5700
Fax: (905) 817-5777

CAM FCD-01302 /2 Page ____ of ____

ANALYSIS REQUESTED

CLIENT INFORMATION SECTION

Company Name: RWDI
Project Manager: Kirk Easto
e-mail: kirk.easto@rwdi.com
Address: 600 Southgate Dr. Gielph, ON

Phone: (519) 823-1311 Fax:

Sampled by: JDF

Field Sample ID	Total Volume Sampled	Flow Rate	Collection Date	Sample Collection Time	US EPA Method IO2, IO3 & IO5 (Metals and TSP, see list)
OPG - October 10	.	40 CFM	2018/10/10	24 hrs	x
Cove - October 10		40 CFM	2018/10/10	24 hrs	x
Beach - October 10		40 CFM	2018/10/10	24 hrs	x
OPG - October 11		40 CFM	2018/10/11	24 hrs	x
Cove - October 11		40 CFM	2018/10/11	24 hrs	x
Beach - October 11		40 CFM	2018/10/11	24 hrs	x
OPG - October 12		40 CFM	2018/10/12	24 hrs	x
Cove - October 12		40 CFM	2018/10/12	24 hrs	x
Beach - October 12		40 CFM	2018/10/12	24 hrs	x
Hi Vol Filter BLANK					

TAT Requirement

STD 10 Business day ☑
Rush 5 Business day * ☐
Rush 2 Business day * ☐
* need approval from Maxxam

PROJECT INFORMATION

Project #: 1804600
Name: St Marys Ambient
PO #: 1804600
Maxxam Quote #:
Maxxam Contact:

REPORTING REQUIREMENTS

Summary Report only ☐
EDD ☐

Regulation

Notes

Please note if this samples are "Industrial Hygiene" samples

PROJECT SPECIFIC COMMENTS

See parameter list from Kirk Easto

Client Signature: Joe Frost
Affiliation: Env Tech
Date/Time: 2018/10/15

Received by: [signature] Richard Chan
Affiliation:
Date/Time: 2018/10/15 15:21

Your P.O. #: 1804600
Your Project #: 1804600
Site Location: ST MARYS AMBIENT
Your C.O.C. #: na

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/10/22
Report #: R5450962
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8Q4826
Received: 2018/10/06, 10:50

Sample Matrix: AIR
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Canister Pressure (TO-15)	3	N/A	2018/10/15	BRL SOP-00304	EPA TO-15 m
Volatile Compounds in Air (SUMMA) (1)	3	N/A	2018/10/15	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air by GC/MS/SIM (2)	3	N/A	2018/10/15	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	3	N/A	2018/10/15	BRL SOP-00304	EPA TO-15 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

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Maxxam
A Bureau Veritas Group Company

Your P.O. #: 1804600
Your Project #: 1804600
Site Location: ST MARYS AMBIENT
Your C.O.C. #: na

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/10/22
Report #: R5450962
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8Q4826
Received: 2018/10/06, 10:50

(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Maxxam for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

(2) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Maxxam for a period of 5 calendar days from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B8Q4826
Report Date: 2018/10/22

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

RESULTS OF ANALYSES OF AIR

Maxxam ID		HYR216	HYR217	HYR218		
Sampling Date		2018/10/04	2018/10/04	2018/10/04		
COC Number		na	na	na		
	UNITS	**OPG-OCTOBER 4/11389**	**COVE-OCTOBER 4/17361**	**BEACH-OCTOBER 4/1579**	**MDL**	**QC Batch**
Pressure on Receipt	psig	(-2.7)	(-3.0)	(-4.3)		5784193
QC Batch = Quality Control Batch						

Maxxam Job #: B8Q4826
Report Date: 2018/10/22

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		HYR216	HYR217			
Sampling Date		2018/10/04	2018/10/04			
COC Number		na	na			
	UNITS	**OPG-OCTOBER 4/11389**	**COVE-OCTOBER 4/17361**	**RDL**	**MDL**	**QC Batch**
2-Propanone	ppbv	2.71	4.01	0.20	0.20	5785878
Chloromethane	ppbv	0.45	0.44	0.30	0.10	5784150
Vinyl Chloride	ppbv	ND	ND	0.020	0.020	5785878
Chloroethane	ppbv	ND	ND	0.30	0.10	5784150
Methyl Ethyl Ketone (2-Butanone)	ppbv	ND	ND	0.10	0.10	5785878
cis-1,2-Dichloroethylene	ppbv	ND	ND	0.050	0.050	5785878
trans-1,2-Dichloroethylene	ppbv	ND	ND	0.10	0.10	5785878
Methylene Chloride(Dichloromethane)	ppbv	0.113	0.095	0.050	0.050	5785878
Chloroform	ppbv	ND	ND	0.040	0.040	5785878
Carbon Tetrachloride	ppbv	0.102	0.103	0.050	0.050	5785878
1,1-Dichloroethane	ppbv	ND	ND	0.050	0.050	5785878
1,2-Dichloroethane	ppbv	0.016	0.015	0.010	0.010	5785878
Ethylene Dibromide	ppbv	ND	ND	0.010	0.010	5785878
1,1,1-Trichloroethane	ppbv	ND	ND	0.050	0.050	5785878
1,1,2-Trichloroethane	ppbv	ND	ND	0.012	0.012	5785878
1,1,2,2-Tetrachloroethane	ppbv	ND	ND	0.0027	0.0027	5785878
1,2-Dichloropropane	ppbv	ND	ND	0.050	0.050	5785878
Bromomethane	ppbv	ND	ND	0.050	0.050	5785878
Bromoform	ppbv	ND	ND	0.10	0.10	5785878
Bromodichloromethane	ppbv	ND	ND	0.20	0.10	5784150
Dibromochloromethane	ppbv	ND	ND	0.20	0.10	5784150
Trichloroethylene	ppbv	ND	ND	0.050	0.050	5785878
Tetrachloroethylene	ppbv	ND	ND	0.050	0.050	5785878
Benzene	ppbv	0.075	0.524	0.050	0.050	5785878
Toluene	ppbv	0.105	0.103	0.050	0.050	5785878
Ethylbenzene	ppbv	ND	ND	0.050	0.050	5785878
p+m-Xylene	ppbv	ND	ND	0.10	0.10	5785878
o-Xylene	ppbv	ND	ND	0.050	0.050	5785878
Styrene	ppbv	ND	ND	0.050	0.050	5785878
Chlorobenzene	ppbv	ND	ND	0.050	0.050	5785878
Cumene (Isopropylbenzene)	ppbv	ND	ND	0.50	0.10	5792841
Total Xylenes	ppbv	ND	ND	0.15	0.15	5785878
1,1,1,2-Tetrachloroethane	ppbv	ND	ND	0.021	0.021	5785878

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		HYR216	HYR217			
Sampling Date		2018/10/04	2018/10/04			
COC Number		na	na			
	UNITS	**OPG-OCTOBER 4/11389**	**COVE-OCTOBER 4/17361**	**RDL**	**MDL**	**QC Batch**
Surrogate Recovery (%)						
Bromochloromethane	%	88	84			5785878
D5-Chlorobenzene	%	80	71			5785878
Difluorobenzene	%	82	76			5785878
Bromochloromethane	%	88	84			5784150
D5-Chlorobenzene	%	80	71			5784150
Difluorobenzene	%	82	76			5784150

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8Q4826
Report Date: 2018/10/22

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		HYR218			
Sampling Date		2018/10/04			
COC Number		na			
	UNITS	**BEACH-OCTOBER 4/1579**	**RDL**	**MDL**	**QC Batch**
2-Propanone	ppbv	1.98	0.20	0.20	5785878
Chloromethane	ppbv	0.44	0.30	0.10	5784150
Vinyl Chloride	ppbv	ND	0.020	0.020	5785878
Chloroethane	ppbv	ND	0.30	0.10	5784150
Methyl Ethyl Ketone (2-Butanone)	ppbv	ND	0.10	0.10	5785878
cis-1,2-Dichloroethylene	ppbv	ND	0.050	0.050	5785878
trans-1,2-Dichloroethylene	ppbv	ND	0.10	0.10	5785878
Methylene Chloride(Dichloromethane)	ppbv	0.104	0.050	0.050	5785878
Chloroform	ppbv	ND	0.040	0.040	5785878
Carbon Tetrachloride	ppbv	0.110	0.050	0.050	5785878
1,1-Dichloroethane	ppbv	ND	0.050	0.050	5785878
1,2-Dichloroethane	ppbv	0.015	0.010	0.010	5785878
Ethylene Dibromide	ppbv	ND	0.010	0.010	5785878
1,1,1-Trichloroethane	ppbv	ND	0.050	0.050	5785878
1,1,2-Trichloroethane	ppbv	ND	0.012	0.012	5785878
1,1,2,2-Tetrachloroethane	ppbv	ND	0.0027	0.0027	5785878
1,2-Dichloropropane	ppbv	0.146	0.050	0.050	5785878
Bromomethane	ppbv	ND	0.050	0.050	5785878
Bromoform	ppbv	ND	0.10	0.10	5785878
Bromodichloromethane	ppbv	ND	0.20	0.10	5784150
Dibromochloromethane	ppbv	ND	0.20	0.10	5784150
Trichloroethylene	ppbv	ND	0.050	0.050	5785878
Tetrachloroethylene	ppbv	ND	0.050	0.050	5785878
Benzene	ppbv	0.108	0.050	0.050	5785878
Toluene	ppbv	0.115	0.050	0.050	5785878
Ethylbenzene	ppbv	ND	0.050	0.050	5785878
p+m-Xylene	ppbv	ND	0.10	0.10	5785878
o-Xylene	ppbv	ND	0.050	0.050	5785878
Styrene	ppbv	ND	0.050	0.050	5785878
Chlorobenzene	ppbv	ND	0.050	0.050	5785878
Cumene (Isopropylbenzene)	ppbv	ND	0.50	0.10	5792841
Total Xylenes	ppbv	ND	0.15	0.15	5785878
1,1,1,2-Tetrachloroethane	ppbv	ND	0.021	0.021	5785878

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B8Q4826
Report Date: 2018/10/22

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		HYR218			
Sampling Date		2018/10/04			
COC Number		na			
	UNITS	**BEACH-OCTOBER 4/1579**	**RDL**	**MDL**	**QC Batch**
Surrogate Recovery (%)					
Bromochloromethane	%	85			5785878
D5-Chlorobenzene	%	69			5785878
Difluorobenzene	%	73			5785878
Bromochloromethane	%	85			5784150
D5-Chlorobenzene	%	69			5784150
Difluorobenzene	%	73			5784150

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8Q4826
Report Date: 2018/10/22

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

TEST SUMMARY

Maxxam ID: HYR216
Sample ID: OPG-OCTOBER 4/11389
Matrix: AIR

Collected: 2018/10/04
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5784193	N/A	2018/10/15	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5792841	N/A	2018/10/15	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5785878	N/A	2018/10/15	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5784150	N/A	2018/10/15	Jismon Mathew

Maxxam ID: HYR217
Sample ID: COVE-OCTOBER 4/17361
Matrix: AIR

Collected: 2018/10/04
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5784193	N/A	2018/10/15	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5792841	N/A	2018/10/15	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5785878	N/A	2018/10/15	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5784150	N/A	2018/10/15	Jismon Mathew

Maxxam ID: HYR218
Sample ID: BEACH-OCTOBER 4/1579
Matrix: AIR

Collected: 2018/10/04
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5784193	N/A	2018/10/15	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5792841	N/A	2018/10/15	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5785878	N/A	2018/10/15	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5784150	N/A	2018/10/15	Jismon Mathew

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GENERAL COMMENTS

Results relate only to the items tested.

Maxxam
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Maxxam Job #: B8Q4826
Report Date: 2018/10/22

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5784150	J-M	Spiked Blank	Bromochloromethane	2018/10/15		103	%	60 - 140
			D5-Chlorobenzene	2018/10/15		105	%	60 - 140
			Difluorobenzene	2018/10/15		106	%	60 - 140
			Chloromethane	2018/10/15		87	%	70 - 130
			Chloroethane	2018/10/15		93	%	70 - 130
			Bromodichloromethane	2018/10/15		94	%	70 - 130
			Dibromochloromethane	2018/10/15		101	%	70 - 130
5784150	J-M	Method Blank	Bromochloromethane	2018/10/15		94	%	60 - 140
			D5-Chlorobenzene	2018/10/15		72	%	60 - 140
			Difluorobenzene	2018/10/15		78	%	60 - 140
			Chloromethane	2018/10/15	ND, RDL=0.30		ppbv	
			Chloroethane	2018/10/15	ND, RDL=0.30		ppbv	
			Bromodichloromethane	2018/10/15	ND, RDL=0.20		ppbv	
			Dibromochloromethane	2018/10/15	ND, RDL=0.20		ppbv	
5784150	J-M	RPD - Sample/Sample Dup	Chloromethane	2018/10/15	0.68		%	25
			Chloroethane	2018/10/15	NC		%	25
			Bromodichloromethane	2018/10/15	NC		%	25
			Dibromochloromethane	2018/10/15	NC		%	25
5785878	J-M	Spiked Blank	2-Propanone	2018/10/15		94	%	70 - 130
			Bromochloromethane	2018/10/15		103	%	60 - 140
			D5-Chlorobenzene	2018/10/15		105	%	60 - 140
			Difluorobenzene	2018/10/15		106	%	60 - 140
			Vinyl Chloride	2018/10/15		87	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2018/10/15		105	%	70 - 130
			cis-1,2-Dichloroethylene	2018/10/15		96	%	70 - 130
			trans-1,2-Dichloroethylene	2018/10/15		99	%	70 - 130
			Methylene Chloride(Dichloromethane)	2018/10/15		88	%	70 - 130
			Chloroform	2018/10/15		93	%	70 - 130
			Carbon Tetrachloride	2018/10/15		91	%	70 - 130
			1,1-Dichloroethane	2018/10/15		92	%	70 - 130
			1,2-Dichloroethane	2018/10/15		92	%	70 - 130
			Ethylene Dibromide	2018/10/15		96	%	70 - 130
			1,1,1-Trichloroethane	2018/10/15		84	%	70 - 130
			1,1,2-Trichloroethane	2018/10/15		94	%	70 - 130
			1,1,2,2-Tetrachloroethane	2018/10/15		92	%	70 - 130
			1,2-Dichloropropane	2018/10/15		97	%	70 - 130
			Bromomethane	2018/10/15		96	%	70 - 130
			Bromoform	2018/10/15		102	%	70 - 130
			Trichloroethylene	2018/10/15		89	%	70 - 130
			Tetrachloroethylene	2018/10/15		93	%	70 - 130
			Benzene	2018/10/15		98	%	70 - 130
			Toluene	2018/10/15		106	%	70 - 130
			Ethylbenzene	2018/10/15		104	%	70 - 130
			p+m-Xylene	2018/10/15		102	%	70 - 130
			o-Xylene	2018/10/15		104	%	70 - 130
			Styrene	2018/10/15		107	%	70 - 130
			Chlorobenzene	2018/10/15		99	%	70 - 130

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Maxxam Job #: B8Q4826
Report Date: 2018/10/22

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Total Xylenes	2018/10/15		103	%	70 - 130
5785878	J-M	Method Blank	2-Propanone	2018/10/15	ND, RDL=0.20		ppbv	
			Bromochloromethane	2018/10/15		94	%	60 - 140
			D5-Chlorobenzene	2018/10/15		72	%	60 - 140
			Difluorobenzene	2018/10/15		78	%	60 - 140
			Vinyl Chloride	2018/10/15	ND, RDL=0.020		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2018/10/15	ND, RDL=0.10		ppbv	
			cis-1,2-Dichloroethylene	2018/10/15	ND, RDL=0.050		ppbv	
			trans-1,2-Dichloroethylene	2018/10/15	ND, RDL=0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2018/10/15	ND, RDL=0.050		ppbv	
			Chloroform	2018/10/15	ND, RDL=0.040		ppbv	
			Carbon Tetrachloride	2018/10/15	ND, RDL=0.050		ppbv	
			1,1-Dichloroethane	2018/10/15	ND, RDL=0.050		ppbv	
			1,2-Dichloroethane	2018/10/15	ND, RDL=0.010		ppbv	
			Ethylene Dibromide	2018/10/15	ND, RDL=0.010		ppbv	
			1,1,1-Trichloroethane	2018/10/15	ND, RDL=0.050		ppbv	
			1,1,2-Trichloroethane	2018/10/15	ND, RDL=0.012		ppbv	
			1,1,2,2-Tetrachloroethane	2018/10/15	ND, RDL=0.0027		ppbv	
			1,2-Dichloropropane	2018/10/15	ND, RDL=0.050		ppbv	
			Bromomethane	2018/10/15	ND, RDL=0.050		ppbv	
			Bromoform	2018/10/15	ND, RDL=0.10		ppbv	
			Trichloroethylene	2018/10/15	ND, RDL=0.050		ppbv	
			Tetrachloroethylene	2018/10/15	ND, RDL=0.050		ppbv	
			Benzene	2018/10/15	ND, RDL=0.050		ppbv	
			Toluene	2018/10/15	ND, RDL=0.050		ppbv	
			Ethylbenzene	2018/10/15	ND, RDL=0.050		ppbv	
			p+m-Xylene	2018/10/15	ND, RDL=0.10		ppbv	

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Maxxam
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Maxxam Job #: B8Q4826
Report Date: 2018/10/22

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			o-Xylene	2018/10/15	ND, RDL=0.050		ppbv	
			Styrene	2018/10/15	ND, RDL=0.050		ppbv	
			Chlorobenzene	2018/10/15	ND, RDL=0.050		ppbv	
			Total Xylenes	2018/10/15	ND, RDL=0.15		ppbv	
			1,1,1,2-Tetrachloroethane	2018/10/15	ND, RDL=0.021		ppbv	
5785878	J-M	RPD - Sample/Sample Dup	2-Propanone	2018/10/15	NC		%	N/A
			Vinyl Chloride	2018/10/15	NC		%	25
			Methyl Ethyl Ketone (2-Butanone)	2018/10/15	1.8		%	25
			cis-1,2-Dichloroethylene	2018/10/15	NC		%	25
			trans-1,2-Dichloroethylene	2018/10/15	NC		%	25
			Methylene Chloride(Dichloromethane)	2018/10/15	1.1		%	25
			Chloroform	2018/10/15	1.4		%	25
			Carbon Tetrachloride	2018/10/15	0.26		%	25
			1,1-Dichloroethane	2018/10/15	NC		%	25
			1,2-Dichloroethane	2018/10/15	15		%	25
			Ethylene Dibromide	2018/10/15	NC		%	25
			1,1,1-Trichloroethane	2018/10/15	NC		%	25
			1,1,2-Trichloroethane	2018/10/15	NC		%	25
			1,1,2,2-Tetrachloroethane	2018/10/15	NC		%	25
			1,2-Dichloropropane	2018/10/15	NC		%	25
			Bromomethane	2018/10/15	NC		%	25
			Bromoform	2018/10/15	NC		%	25
			Trichloroethylene	2018/10/15	5.6		%	25
			Tetrachloroethylene	2018/10/15	1.3		%	25
			Benzene	2018/10/15	1.4		%	25
			Toluene	2018/10/15	0.076		%	25
			Ethylbenzene	2018/10/15	1.0		%	25
			p+m-Xylene	2018/10/15	0.24		%	25
			o-Xylene	2018/10/15	2.1		%	25
			Styrene	2018/10/15	7.4		%	25
			Chlorobenzene	2018/10/15	NC		%	25
			Total Xylenes	2018/10/15	0.018		%	25
			1,1,1,2-Tetrachloroethane	2018/10/15	NC		%	25
5792841	J-M	Spiked Blank	Cumene (Isopropylbenzene)	2018/10/15		107	%	N/A
5792841	J-M	Method Blank	Cumene (Isopropylbenzene)	2018/10/15	ND, RDL=0.50		ppbv	

N/A = Not Applicable

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B8Q4826
Report Date: 2018/10/22

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Maureen Smith

Maureen Smith, Supervisor, Volatiles

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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06-Oct-18 10:50
Clayton Johnson
B8Q4826
KK4 AIR-001

...orm - Summa™ Canister

...ampobello Rd
...auga Ontario ,L5N 2L8
...axxam.ca

Toll Free: 1-800-668-0639
Phone: (905) 817-5700
Fax: (905) 817-5777

CAM FCD-01302 /2 Page ___ of ___

Company Name: RWDI	**REPORT INFORMATION** Company Name: SAME
Contact Name Kirk Easto	Project Manager:
Address: 600 Southgate Drive	Address:
E-mail: kirk.easto@rwdi.com	E-mail:
Ph:	Ph:
Sampled by: JDF	

ANALYSIS REQUESTED

Field Sample ID	Canister Serial #	Flow Regulator Serial #	Collection Date	START VACUUM (inches of Hg)	END VACUUM (inches of Hg)	SOIL VAPOUR	AMBIENT/INDOOR AIR	AMBIENT/COMMERCIAL/INDUSTRIAL	SUB-SLAB GAS	FULL LIST OF VOCs (reference TO15A)	Aromatic/Aliphatic Hydrocarbon Fractions	F1 (C6-C10) and F2 (C10-C16)	Selected VOC's - please specify	Other				CANISTERS NOT USED
OPG - October 4	11389	FX1357	2018/10/04	-28	-5		O	A		x								
Cove - October 4	17361	FX1403	2018/10/04	-29	-7		O	A		x								
Beach - October 4	1579	FX1314	2018/10/04	-28	-7		O	A		x								

TAT Requirement

- STD 10 Business day ☐
- Rush 5 Business day * ☐
- Rush 2 Business day * ☐
- Rush Other * ☐

* need approval from Maxxam

PROJECT INFORMATION

Project #: 1804600
Name: St Marys Ambient
PO #: 1804600
Maxxam Quote #:
Maxxam Contact:
Task Order/Line Item

REPORTING REQUIREMENTS

EDD ☐
Regulations ON 153 ☐
ON 419 ☐
BC CSR ☐
Other

Notes

1) please indicate on chain of custody if your samples are soil vapour or ambient air
2) please list all canisters on the chain of custody even if unused

PROJECT SPECIFIC COMMENTS

See parameter list from Kirk Easto

Client Signature:
Date/Time:

Received by: Pickup/Receipt [illegible]
Date/Time: 2018/10/06 10:50

PLEASE RETURN ALL UNUSED EQUIPMENT

Your P.O. #: 1804600
Your Project #: 1804600
Site Location: ST MARYS AMBIENT
Your C.O.C. #: na

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/10/22
Report #: R5450968
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8Q4860
Received: 2018/10/06, 10:50

Sample Matrix: AIR
Samples Received: 12

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Canister Pressure (TO-15)	12	N/A	2018/10/17	BRL SOP-00304	EPA TO-15 m
Volatile Compounds in Air (SUMMA) (1)	12	N/A	2018/10/17	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air by GC/MS/SIM (2)	12	N/A	2018/10/17	BRL SOP-00304	EPA TO-15 m
Volatile Organics in Air (TO-15) (1)	12	N/A	2018/10/17	BRL SOP-00304	EPA TO-15 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

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Your P.O. #: 1804600
Your Project #: 1804600
Site Location: ST MARYS AMBIENT
Your C.O.C. #: na

Attention: Kirk Easto

RWDI Air Inc
600 Southgate Drive
Guelph, ON
CANADA N1G 4P6

Report Date: 2018/10/22
Report #: R5450968
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8Q4860
Received: 2018/10/06, 10:50

(1) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister also underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Maxxam for a period of 5 calendar days or as contractually agreed from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

(2) Air sampling canisters have been cleaned in accordance with U.S. EPA Method TO15. At the end of the cleaning, evacuation, and pressurization cycles, one canister was selected and was pressurized with Zero Air. This canister was then analyzed via TO15 on a GC/MS. The canister must have been found to contain <0.2 ppbv concentration of all target analytes in order for the batch to have been considered clean. Each canister underwent a leak check prior to shipment.

Please Note: SUMMA® canister samples will be retained by Maxxam for a period of 5 calendar days from the date of this report, after which time they will be cleaned for reuse. If you require a longer sample storage period, please contact your service representative.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Clayton Johnson, Project Manager - Air Toxics, Source Evaluation
Email: CJohnson@maxxam.ca
Phone# (905)817-5769
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B8Q4860
Report Date: 2018/10/22

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

RESULTS OF ANALYSES OF AIR

Maxxam ID		HYR400	HYR401	HYR402	HYR403		
Sampling Date		2018/09/30	2018/09/30	2018/09/30	2018/10/01		
COC Number		na	na	na	na		
	UNITS	**OPG-SEPTEMBER 30 / 17358**	**COVE-SEPTEMBER 30 / 17986**	**BEACH-SEPTEMBER 30 / 23463**	**OPG-OCTOBER 1 / 13930**	**MDL**	**QC Batch**
Pressure on Receipt	psig	(-3.1)	(-3.3)	(-3.4)	(-3.1)		5790048
QC Batch = Quality Control Batch							

Maxxam ID		HYR404	HYR405	HYR406	HYR407		
Sampling Date		2018/10/01	2018/10/01	2018/10/02	2018/10/02		
COC Number		na	na	na	na		
	UNITS	**COVE-OCTOBER 01 / 16+18**	**BEACH-OCTOBER 01 / 23473**	**OPG-OCTOBER 02 / 1616**	**COVE-OCTOBER 02 / 116+08**	**MDL**	**QC Batch**
Pressure on Receipt	psig	(-2.7)	(-3.3)	(-2.9)	(-2.6)		5790048
QC Batch = Quality Control Batch							

Maxxam ID		HYR408	HYR409	HYR410	HYR411		
Sampling Date		2018/10/02	2018/10/03	2018/10/03	2018/10/03		
COC Number		na	na	na	na		
	UNITS	**BEACH-OCTOBER 02 / 5838**	**OPG-OCTOBER 03 / 15296**	**COVE-OCTOBER 03 / 11380**	**BEACH-OCTOBER 03 / 11635**	**MDL**	**QC Batch**
Pressure on Receipt	psig	(-3.1)	(-2.6)	(-3.1)	(-3.3)		5790048
QC Batch = Quality Control Batch							

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Maxxam
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Maxxam Job #: B8Q4860
Report Date: 2018/10/22

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		HYR400	HYR401	HYR402			
Sampling Date		2018/09/30	2018/09/30	2018/09/30			
COC Number		na	na	na			
	UNITS	**OPG-SEPTEMBER 30 / 17358**	**COVE-SEPTEMBER 30 / 17986**	**BEACH-SEPTEMBER 30 / 23463**	**RDL**	**MDL**	**QC Batch**
2-Propanone	ppbv	2.35	2.47	4.09	0.15	0.15	5791119
Chloromethane	ppbv	0.44	0.44	0.43	0.30	0.10	5789999
Vinyl Chloride	ppbv	ND	ND	ND	0.020	0.020	5791119
Chloroethane	ppbv	ND	ND	ND	0.30	0.10	5789999
Methyl Ethyl Ketone (2-Butanone)	ppbv	ND	ND	ND	0.10	0.10	5791119
cis-1,2-Dichloroethylene	ppbv	ND	ND	ND	0.050	0.050	5791119
trans-1,2-Dichloroethylene	ppbv	ND	ND	ND	0.10	0.10	5791119
Methylene Chloride(Dichloromethane)	ppbv	0.119	0.118	0.181	0.050	0.050	5791119
Chloroform	ppbv	ND	ND	ND	0.040	0.040	5791119
Carbon Tetrachloride	ppbv	0.120	0.120	0.116	0.050	0.050	5791119
1,1-Dichloroethane	ppbv	ND	ND	ND	0.050	0.050	5791119
1,2-Dichloroethane	ppbv	0.017	0.016	0.015	0.010	0.010	5791119
Ethylene Dibromide	ppbv	ND	ND	ND	0.010	0.010	5791119
1,1,1-Trichloroethane	ppbv	ND	ND	ND	0.060	0.060	5791119
1,1,2-Trichloroethane	ppbv	ND	ND	ND	0.012	0.012	5791119
1,1,2,2-Tetrachloroethane	ppbv	ND	ND	ND	0.0027	0.0027	5791119
1,2-Dichloropropane	ppbv	0.097	ND	ND	0.050	0.050	5791119
Bromomethane	ppbv	ND	ND	ND	0.050	0.050	5791119
Bromoform	ppbv	ND	ND	ND	0.10	0.10	5791119
Bromodichloromethane	ppbv	ND	ND	ND	0.20	0.10	5789999
Dibromochloromethane	ppbv	ND	ND	ND	0.20	0.10	5789999
Trichloroethylene	ppbv	ND	ND	ND	0.060	0.060	5791119
Tetrachloroethylene	ppbv	ND	ND	ND	0.060	0.060	5791119
Benzene	ppbv	0.612	0.113	0.124	0.050	0.050	5791119
Toluene	ppbv	0.166	0.212	0.202	0.050	0.050	5791119
Ethylbenzene	ppbv	ND	ND	ND	0.050	0.050	5791119
p+m-Xylene	ppbv	ND	ND	ND	0.10	0.10	5791119
o-Xylene	ppbv	ND	ND	ND	0.050	0.050	5791119
Styrene	ppbv	ND	ND	ND	0.050	0.050	5791119
Chlorobenzene	ppbv	ND	ND	ND	0.050	0.050	5791119
Cumene (Isopropylbenzene)	ppbv	ND	ND	ND	0.50	0.10	5791122
Total Xylenes	ppbv	ND	ND	ND	0.15	0.15	5791119
1,1,1,2-Tetrachloroethane	ppbv	ND	ND	ND	0.021	0.021	5791119

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B8Q4860
Report Date: 2018/10/22

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		HYR400	HYR401	HYR402			
Sampling Date		2018/09/30	2018/09/30	2018/09/30			
COC Number		na	na	na			
	UNITS	**OPG-SEPTEMBER 30 / 17358**	**COVE-SEPTEMBER 30 / 17986**	**BEACH-SEPTEMBER 30 / 23463**	**RDL**	**MDL**	**QC Batch**
Surrogate Recovery (%)							
Bromochloromethane	%	90	89	89			5791119
D5-Chlorobenzene	%	73	68	71			5791119
Difluorobenzene	%	78	75	76			5791119
Bromochloromethane	%	90	89	89			5789999
D5-Chlorobenzene	%	73	68	71			5789999
Difluorobenzene	%	78	75	76			5789999

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8Q4860
Report Date: 2018/10/22

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		HYR403	HYR404	HYR405			
Sampling Date		2018/10/01	2018/10/01	2018/10/01			
COC Number		na	na	na			
	UNITS	**OPG-OCTOBER 1 / 13930**	**COVE-OCTOBER 01 / 16+18**	**BEACH-OCTOBER 01 / 23473**	**RDL**	**MDL**	**QC Batch**
2-Propanone	ppbv	2.81	1.53	1.75	0.15	0.15	5791119
Chloromethane	ppbv	0.45	0.44	0.43	0.30	0.10	5789999
Vinyl Chloride	ppbv	ND	ND	ND	0.020	0.020	5791119
Chloroethane	ppbv	ND	ND	ND	0.30	0.10	5789999
Methyl Ethyl Ketone (2-Butanone)	ppbv	ND	ND	ND	0.10	0.10	5791119
cis-1,2-Dichloroethylene	ppbv	ND	ND	ND	0.050	0.050	5791119
trans-1,2-Dichloroethylene	ppbv	ND	ND	ND	0.10	0.10	5791119
Methylene Chloride(Dichloromethane)	ppbv	0.235	0.095	0.112	0.050	0.050	5791119
Chloroform	ppbv	ND	ND	ND	0.040	0.040	5791119
Carbon Tetrachloride	ppbv	0.128	0.138	0.138	0.050	0.050	5791119
1,1-Dichloroethane	ppbv	ND	ND	ND	0.050	0.050	5791119
1,2-Dichloroethane	ppbv	0.016	0.015	0.015	0.010	0.010	5791119
Ethylene Dibromide	ppbv	ND	ND	ND	0.010	0.010	5791119
1,1,1-Trichloroethane	ppbv	ND	ND	ND	0.060	0.060	5791119
1,1,2-Trichloroethane	ppbv	ND	ND	ND	0.012	0.012	5791119
1,1,2,2-Tetrachloroethane	ppbv	ND	ND	ND	0.0027	0.0027	5791119
1,2-Dichloropropane	ppbv	0.092	ND	ND	0.050	0.050	5791119
Bromomethane	ppbv	ND	ND	ND	0.050	0.050	5791119
Bromoform	ppbv	ND	ND	ND	0.10	0.10	5791119
Bromodichloromethane	ppbv	ND	ND	ND	0.20	0.10	5789999
Dibromochloromethane	ppbv	ND	ND	ND	0.20	0.10	5789999
Trichloroethylene	ppbv	ND	ND	ND	0.060	0.060	5791119
Tetrachloroethylene	ppbv	ND	ND	ND	0.060	0.060	5791119
Benzene	ppbv	0.131	0.070	0.094	0.050	0.050	5791119
Toluene	ppbv	0.208	0.096	0.093	0.050	0.050	5791119
Ethylbenzene	ppbv	ND	0.073	ND	0.050	0.050	5791119
p+m-Xylene	ppbv	ND	0.27	ND	0.10	0.10	5791119
o-Xylene	ppbv	ND	0.086	ND	0.050	0.050	5791119
Styrene	ppbv	ND	ND	ND	0.050	0.050	5791119
Chlorobenzene	ppbv	ND	ND	ND	0.050	0.050	5791119
Cumene (Isopropylbenzene)	ppbv	ND	ND	ND	0.50	0.10	5791122
Total Xylenes	ppbv	ND	0.35	ND	0.15	0.15	5791119
1,1,1,2-Tetrachloroethane	ppbv	ND	ND	ND	0.021	0.021	5791119

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B8Q4860
Report Date: 2018/10/22

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		HYR403	HYR404	HYR405			
Sampling Date		2018/10/01	2018/10/01	2018/10/01			
COC Number		na	na	na			
	UNITS	**OPG-OCTOBER 1 / 13930**	**COVE-OCTOBER 01 / 16+18**	**BEACH-OCTOBER 01 / 23473**	**RDL**	**MDL**	**QC Batch**
Surrogate Recovery (%)							
Bromochloromethane	%	85	86	84			5791119
D5-Chlorobenzene	%	68	68	64			5791119
Difluorobenzene	%	70	70	66			5791119
Bromochloromethane	%	85	86	84			5789999
D5-Chlorobenzene	%	68	68	64			5789999
Difluorobenzene	%	70	70	66			5789999

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B8Q4860
Report Date: 2018/10/22

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		HYR406	HYR407	HYR408			
Sampling Date		2018/10/02	2018/10/02	2018/10/02			
COC Number		na	na	na			
	UNITS	**OPG-OCTOBER 02 / 1616**	**COVE-OCTOBER 02 / 116+08**	**BEACH-OCTOBER 02 / 5838**	**RDL**	**MDL**	**QC Batch**
2-Propanone	ppbv	1.61	1.88	2.08	0.15	0.15	5791119
Chloromethane	ppbv	0.43	0.42	0.45	0.30	0.10	5789999
Vinyl Chloride	ppbv	ND	ND	ND	0.020	0.020	5791119
Chloroethane	ppbv	ND	ND	ND	0.30	0.10	5789999
Methyl Ethyl Ketone (2-Butanone)	ppbv	ND	ND	ND	0.10	0.10	5791119
cis-1,2-Dichloroethylene	ppbv	ND	ND	ND	0.050	0.050	5791119
trans-1,2-Dichloroethylene	ppbv	ND	ND	ND	0.10	0.10	5791119
Methylene Chloride(Dichloromethane)	ppbv	0.109	0.139	0.108	0.050	0.050	5791119
Chloroform	ppbv	ND	ND	ND	0.040	0.040	5791119
Carbon Tetrachloride	ppbv	0.122	0.126	0.130	0.050	0.050	5791119
1,1-Dichloroethane	ppbv	ND	ND	ND	0.050	0.050	5791119
1,2-Dichloroethane	ppbv	0.015	0.017	0.017	0.010	0.010	5791119
Ethylene Dibromide	ppbv	ND	ND	ND	0.010	0.010	5791119
1,1,1-Trichloroethane	ppbv	ND	ND	ND	0.060	0.060	5791119
1,1,2-Trichloroethane	ppbv	ND	ND	ND	0.012	0.012	5791119
1,1,2,2-Tetrachloroethane	ppbv	ND	ND	ND	0.0027	0.0027	5791119
1,2-Dichloropropane	ppbv	ND	ND	0.073	0.050	0.050	5791119
Bromomethane	ppbv	ND	ND	ND	0.050	0.050	5791119
Bromoform	ppbv	ND	ND	ND	0.10	0.10	5791119
Bromodichloromethane	ppbv	ND	ND	ND	0.20	0.10	5789999
Dibromochloromethane	ppbv	ND	ND	ND	0.20	0.10	5789999
Trichloroethylene	ppbv	ND	ND	ND	0.060	0.060	5791119
Tetrachloroethylene	ppbv	ND	ND	ND	0.060	0.060	5791119
Benzene	ppbv	0.111	0.095	0.096	0.050	0.050	5791119
Toluene	ppbv	0.145	0.181	0.148	0.050	0.050	5791119
Ethylbenzene	ppbv	ND	ND	ND	0.050	0.050	5791119
p+m-Xylene	ppbv	ND	0.12	ND	0.10	0.10	5791119
o-Xylene	ppbv	ND	ND	ND	0.050	0.050	5791119
Styrene	ppbv	ND	ND	ND	0.050	0.050	5791119
Chlorobenzene	ppbv	ND	ND	ND	0.050	0.050	5791119
Cumene (Isopropylbenzene)	ppbv	ND	ND	ND	0.50	0.10	5791122
Total Xylenes	ppbv	ND	ND	ND	0.15	0.15	5791119
1,1,1,2-Tetrachloroethane	ppbv	ND	ND	ND	0.021	0.021	5791119

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Maxxam Job #: B8Q4860
Report Date: 2018/10/22

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		HYR406	HYR407	HYR408			
Sampling Date		2018/10/02	2018/10/02	2018/10/02			
COC Number		na	na	na			
	UNITS	**OPG-OCTOBER 02 / 1616**	**COVE-OCTOBER 02 / 116+08**	**BEACH-OCTOBER 02 / 5838**	**RDL**	**MDL**	**QC Batch**
Surrogate Recovery (%)							
Bromochloromethane	%	88	85	84			5791119
D5-Chlorobenzene	%	70	68	66			5791119
Difluorobenzene	%	72	69	68			5791119
Bromochloromethane	%	88	85	84			5789999
D5-Chlorobenzene	%	70	68	66			5789999
Difluorobenzene	%	72	69	68			5789999

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8Q4860
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RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		HYR409	HYR410	HYR411			
Sampling Date		2018/10/03	2018/10/03	2018/10/03			
COC Number		na	na	na			
	UNITS	**OPG-OCTOBER 03 / 15296**	**COVE-OCTOBER 03 / 11380**	**BEACH-OCTOBER 03 / 11635**	**RDL**	**MDL**	**QC Batch**
2-Propanone	ppbv	2.91	3.25	1.90	0.15	0.15	5791119
Chloromethane	ppbv	0.45	0.47	0.47	0.30	0.10	5789999
Vinyl Chloride	ppbv	ND	ND	ND	0.020	0.020	5791119
Chloroethane	ppbv	ND	ND	ND	0.30	0.10	5789999
Methyl Ethyl Ketone (2-Butanone)	ppbv	ND	ND	ND	0.10	0.10	5791119
cis-1,2-Dichloroethylene	ppbv	ND	ND	ND	0.050	0.050	5791119
trans-1,2-Dichloroethylene	ppbv	ND	ND	ND	0.10	0.10	5791119
Methylene Chloride(Dichloromethane)	ppbv	0.121	0.117	0.109	0.050	0.050	5791119
Chloroform	ppbv	ND	ND	ND	0.040	0.040	5791119
Carbon Tetrachloride	ppbv	0.128	0.137	0.135	0.050	0.050	5791119
1,1-Dichloroethane	ppbv	ND	ND	ND	0.050	0.050	5791119
1,2-Dichloroethane	ppbv	0.016	0.016	0.016	0.010	0.010	5791119
Ethylene Dibromide	ppbv	ND	ND	ND	0.010	0.010	5791119
1,1,1-Trichloroethane	ppbv	ND	ND	ND	0.060	0.060	5791119
1,1,2-Trichloroethane	ppbv	ND	ND	ND	0.012	0.012	5791119
1,1,2,2-Tetrachloroethane	ppbv	ND	ND	ND	0.0027	0.0027	5791119
1,2-Dichloropropane	ppbv	0.109	ND	ND	0.050	0.050	5791119
Bromomethane	ppbv	ND	ND	ND	0.050	0.050	5791119
Bromoform	ppbv	ND	ND	ND	0.10	0.10	5791119
Bromodichloromethane	ppbv	ND	ND	ND	0.20	0.10	5789999
Dibromochloromethane	ppbv	ND	ND	ND	0.20	0.10	5789999
Trichloroethylene	ppbv	ND	ND	ND	0.060	0.060	5791119
Tetrachloroethylene	ppbv	ND	0.083	ND	0.060	0.060	5791119
Benzene	ppbv	0.142	0.096	0.102	0.050	0.050	5791119
Toluene	ppbv	0.157	0.131	0.144	0.050	0.050	5791119
Ethylbenzene	ppbv	ND	ND	ND	0.050	0.050	5791119
p+m-Xylene	ppbv	ND	ND	ND	0.10	0.10	5791119
o-Xylene	ppbv	ND	ND	ND	0.050	0.050	5791119
Styrene	ppbv	ND	ND	ND	0.050	0.050	5791119
Chlorobenzene	ppbv	ND	ND	ND	0.050	0.050	5791119
Cumene (Isopropylbenzene)	ppbv	ND	ND	ND	0.50	0.10	5791122
Total Xylenes	ppbv	ND	ND	ND	0.15	0.15	5791119
1,1,1,2-Tetrachloroethane	ppbv	ND	ND	ND	0.021	0.021	5791119

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B8Q4860
Report Date: 2018/10/22

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

VOLATILE ORGANICS BY GC/MS (AIR)

Maxxam ID		HYR409	HYR410	HYR411			
Sampling Date		2018/10/03	2018/10/03	2018/10/03			
COC Number		na	na	na			
	UNITS	**OPG-OCTOBER 03 / 15296**	**COVE-OCTOBER 03 / 11380**	**BEACH-OCTOBER 03 / 11635**	**RDL**	**MDL**	**QC Batch**
Surrogate Recovery (%)							
Bromochloromethane	%	86	86	85			5791119
D5-Chlorobenzene	%	69	66	67			5791119
Difluorobenzene	%	69	69	68			5791119
Bromochloromethane	%	86	86	85			5789999
D5-Chlorobenzene	%	69	66	67			5789999
Difluorobenzene	%	69	69	68			5789999

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8Q4860
Report Date: 2018/10/22

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

TEST SUMMARY

Maxxam ID: HYR400
Sample ID: OPG-SEPTEMBER 30 / 17358
Matrix: AIR

Collected: 2018/09/30
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5790048	N/A	2018/10/17	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5791122	N/A	2018/10/17	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5791119	N/A	2018/10/17	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5789999	N/A	2018/10/17	Jismon Mathew

Maxxam ID: HYR400 Dup
Sample ID: OPG-SEPTEMBER 30 / 17358
Matrix: AIR

Collected: 2018/09/30
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Volatile Compounds in Air (SUMMA)	GC/MS	5791122	N/A	2018/10/17	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5791119	N/A	2018/10/17	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5789999	N/A	2018/10/17	Jismon Mathew

Maxxam ID: HYR401
Sample ID: COVE-SEPTEMBER 30 / 17986
Matrix: AIR

Collected: 2018/09/30
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5790048	N/A	2018/10/17	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5791122	N/A	2018/10/17	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5791119	N/A	2018/10/17	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5789999	N/A	2018/10/17	Jismon Mathew

Maxxam ID: HYR402
Sample ID: BEACH-SEPTEMBER 30 / 23463
Matrix: AIR

Collected: 2018/09/30
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5790048	N/A	2018/10/17	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5791122	N/A	2018/10/17	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5791119	N/A	2018/10/17	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5789999	N/A	2018/10/17	Jismon Mathew

Maxxam ID: HYR403
Sample ID: OPG-OCTOBER 1 / 13930
Matrix: AIR

Collected: 2018/10/01
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5790048	N/A	2018/10/17	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5791122	N/A	2018/10/17	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5791119	N/A	2018/10/17	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5789999	N/A	2018/10/17	Jismon Mathew

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Maxxam Job #: B8Q4860
Report Date: 2018/10/22

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

TEST SUMMARY

Maxxam ID: HYR404 **Collected:** 2018/10/01
Sample ID: COVE-OCTOBER 01 / 16+18 **Shipped:**
Matrix: AIR **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5790048	N/A	2018/10/17	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5791122	N/A	2018/10/17	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5791119	N/A	2018/10/17	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5789999	N/A	2018/10/17	Jismon Mathew

Maxxam ID: HYR405 **Collected:** 2018/10/01
Sample ID: BEACH-OCTOBER 01 / 23473 **Shipped:**
Matrix: AIR **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5790048	N/A	2018/10/17	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5791122	N/A	2018/10/17	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5791119	N/A	2018/10/17	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5789999	N/A	2018/10/17	Jismon Mathew

Maxxam ID: HYR406 **Collected:** 2018/10/02
Sample ID: OPG-OCTOBER 02 / 1616 **Shipped:**
Matrix: AIR **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5790048	N/A	2018/10/17	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5791122	N/A	2018/10/17	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5791119	N/A	2018/10/17	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5789999	N/A	2018/10/17	Jismon Mathew

Maxxam ID: HYR407 **Collected:** 2018/10/02
Sample ID: COVE-OCTOBER 02 / 116+08 **Shipped:**
Matrix: AIR **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5790048	N/A	2018/10/17	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5791122	N/A	2018/10/17	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5791119	N/A	2018/10/17	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5789999	N/A	2018/10/17	Jismon Mathew

Maxxam ID: HYR408 **Collected:** 2018/10/02
Sample ID: BEACH-OCTOBER 02 / 5838 **Shipped:**
Matrix: AIR **Received:** 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5790048	N/A	2018/10/17	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5791122	N/A	2018/10/17	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5791119	N/A	2018/10/17	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5789999	N/A	2018/10/17	Jismon Mathew

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Maxxam Job #: B8Q4860
Report Date: 2018/10/22

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

TEST SUMMARY

Maxxam ID: HYR409
Sample ID: OPG-OCTOBER 03 / 15296
Matrix: AIR

Collected: 2018/10/03
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5790048	N/A	2018/10/17	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5791122	N/A	2018/10/17	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5791119	N/A	2018/10/17	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5789999	N/A	2018/10/17	Jismon Mathew

Maxxam ID: HYR410
Sample ID: COVE-OCTOBER 03 / 11380
Matrix: AIR

Collected: 2018/10/03
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5790048	N/A	2018/10/17	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5791122	N/A	2018/10/17	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5791119	N/A	2018/10/17	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5789999	N/A	2018/10/17	Jismon Mathew

Maxxam ID: HYR411
Sample ID: BEACH-OCTOBER 03 / 11635
Matrix: AIR

Collected: 2018/10/03
Shipped:
Received: 2018/10/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Canister Pressure (TO-15)	PRES	5790048	N/A	2018/10/17	Jismon Mathew
Volatile Compounds in Air (SUMMA)	GC/MS	5791122	N/A	2018/10/17	Jismon Mathew
Volatile Organics in Air by GC/MS/SIM	GC/MS	5791119	N/A	2018/10/17	Jismon Mathew
Volatile Organics in Air (TO-15)	GC/MS	5789999	N/A	2018/10/17	Jismon Mathew

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Maxxam Job #: B8Q4860
Report Date: 2018/10/22

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

GENERAL COMMENTS

Results relate only to the items tested.

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Maxxam Job #: B8Q4860
Report Date: 2018/10/22

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
5789999	J-M	Spiked Blank	Bromochloromethane	2018/10/17		105	%	60 - 140
			D5-Chlorobenzene	2018/10/17		106	%	60 - 140
			Difluorobenzene	2018/10/17		110	%	60 - 140
			Chloromethane	2018/10/17		93	%	70 - 130
			Chloroethane	2018/10/17		94	%	70 - 130
			Bromodichloromethane	2018/10/17		98	%	70 - 130
			Dibromochloromethane	2018/10/17		104	%	70 - 130
5789999	J-M	Method Blank	Bromochloromethane	2018/10/17		92	%	60 - 140
			D5-Chlorobenzene	2018/10/17		68	%	60 - 140
			Difluorobenzene	2018/10/17		75	%	60 - 140
			Chloromethane	2018/10/17	ND, RDL=0.30		ppbv	
			Chloroethane	2018/10/17	ND, RDL=0.30		ppbv	
			Bromodichloromethane	2018/10/17	ND, RDL=0.20		ppbv	
			Dibromochloromethane	2018/10/17	ND, RDL=0.20		ppbv	
5789999	J-M	RPD - Sample/Sample Dup	Chloromethane	2018/10/17	3.8		%	25
			Chloroethane	2018/10/17	NC		%	25
			Bromodichloromethane	2018/10/17	NC		%	25
			Dibromochloromethane	2018/10/17	NC		%	25
5791119	J-M	Spiked Blank	2-Propanone	2018/10/17		99	%	70 - 130
			Bromochloromethane	2018/10/17		105	%	60 - 140
			D5-Chlorobenzene	2018/10/17		106	%	60 - 140
			Difluorobenzene	2018/10/17		110	%	60 - 140
			Vinyl Chloride	2018/10/17		89	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2018/10/17		110	%	70 - 130
			cis-1,2-Dichloroethylene	2018/10/17		98	%	70 - 130
			trans-1,2-Dichloroethylene	2018/10/17		103	%	70 - 130
			Methylene Chloride(Dichloromethane)	2018/10/17		91	%	70 - 130
			Chloroform	2018/10/17		96	%	70 - 130
			Carbon Tetrachloride	2018/10/17		95	%	70 - 130
			1,1-Dichloroethane	2018/10/17		95	%	70 - 130
			1,2-Dichloroethane	2018/10/17		95	%	70 - 130
			Ethylene Dibromide	2018/10/17		99	%	70 - 130
			1,1,1-Trichloroethane	2018/10/17		87	%	70 - 130
			1,1,2-Trichloroethane	2018/10/17		97	%	70 - 130
			1,1,2,2-Tetrachloroethane	2018/10/17		96	%	70 - 130
			1,2-Dichloropropane	2018/10/17		99	%	70 - 130
			Bromomethane	2018/10/17		94	%	70 - 130
			Bromoform	2018/10/17		104	%	70 - 130
			Trichloroethylene	2018/10/17		91	%	70 - 130
			Tetrachloroethylene	2018/10/17		95	%	70 - 130
			Benzene	2018/10/17		102	%	70 - 130
			Toluene	2018/10/17		106	%	70 - 130
			Ethylbenzene	2018/10/17		105	%	70 - 130
			p+m-Xylene	2018/10/17		103	%	70 - 130
			o-Xylene	2018/10/17		106	%	70 - 130
			Styrene	2018/10/17		108	%	70 - 130
			Chlorobenzene	2018/10/17		101	%	70 - 130

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Maxxam Job #: B8Q4860
Report Date: 2018/10/22

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Total Xylenes	2018/10/17		104	%	70 - 130
			1,1,1,2-Tetrachloroethane	2018/10/17		105	%	N/A
5791119	J-M	Method Blank	2-Propanone	2018/10/17	ND, RDL=0.15		ppbv	
			Bromochloromethane	2018/10/17		92	%	60 - 140
			D5-Chlorobenzene	2018/10/17		68	%	60 - 140
			Difluorobenzene	2018/10/17		75	%	60 - 140
			Vinyl Chloride	2018/10/17	ND, RDL=0.020		ppbv	
			Methyl Ethyl Ketone (2-Butanone)	2018/10/17	ND, RDL=0.10		ppbv	
			cis-1,2-Dichloroethylene	2018/10/17	ND, RDL=0.050		ppbv	
			trans-1,2-Dichloroethylene	2018/10/17	ND, RDL=0.10		ppbv	
			Methylene Chloride(Dichloromethane)	2018/10/17	ND, RDL=0.050		ppbv	
			Chloroform	2018/10/17	ND, RDL=0.040		ppbv	
			Carbon Tetrachloride	2018/10/17	ND, RDL=0.050		ppbv	
			1,1-Dichloroethane	2018/10/17	ND, RDL=0.050		ppbv	
			1,2-Dichloroethane	2018/10/17	ND, RDL=0.010		ppbv	
			Ethylene Dibromide	2018/10/17	ND, RDL=0.010		ppbv	
			1,1,1-Trichloroethane	2018/10/17	ND, RDL=0.060		ppbv	
			1,1,2-Trichloroethane	2018/10/17	ND, RDL=0.012		ppbv	
			1,1,2,2-Tetrachloroethane	2018/10/17	ND, RDL=0.0027		ppbv	
			1,2-Dichloropropane	2018/10/17	ND, RDL=0.050		ppbv	
			Bromomethane	2018/10/17	ND, RDL=0.050		ppbv	
			Bromoform	2018/10/17	ND, RDL=0.10		ppbv	
			Trichloroethylene	2018/10/17	ND, RDL=0.060		ppbv	
			Tetrachloroethylene	2018/10/17	ND, RDL=0.060		ppbv	
			Benzene	2018/10/17	ND, RDL=0.050		ppbv	
			Toluene	2018/10/17	ND, RDL=0.050		ppbv	
			Ethylbenzene	2018/10/17	ND, RDL=0.050		ppbv	
			p+m-Xylene	2018/10/17	ND, RDL=0.10		ppbv	

Maxxam A Bureau Veritas Group Company

Maxxam Job #: B8Q4860
Report Date: 2018/10/22

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			o-Xylene	2018/10/17	ND, RDL=0.050		ppbv	
			Styrene	2018/10/17	ND, RDL=0.050		ppbv	
			Chlorobenzene	2018/10/17	ND, RDL=0.050		ppbv	
			Total Xylenes	2018/10/17	ND, RDL=0.15		ppbv	
			1,1,1,2-Tetrachloroethane	2018/10/17	ND, RDL=0.021		ppbv	
5791119	J-M	RPD - Sample/Sample Dup	2-Propanone	2018/10/17	NC		%	N/A
			Vinyl Chloride	2018/10/17	NC		%	25
			Methyl Ethyl Ketone (2-Butanone)	2018/10/17	NC		%	25
			cis-1,2-Dichloroethylene	2018/10/17	NC		%	25
			trans-1,2-Dichloroethylene	2018/10/17	NC		%	25
			Methylene Chloride(Dichloromethane)	2018/10/17	6.4		%	25
			Chloroform	2018/10/17	NC		%	25
			Carbon Tetrachloride	2018/10/17	3.5		%	25
			1,1-Dichloroethane	2018/10/17	NC		%	25
			1,2-Dichloroethane	2018/10/17	1.1		%	25
			Ethylene Dibromide	2018/10/17	NC		%	25
			1,1,1-Trichloroethane	2018/10/17	NC		%	25
			1,1,2-Trichloroethane	2018/10/17	NC		%	25
			1,1,2,2-Tetrachloroethane	2018/10/17	NC		%	25
			1,2-Dichloropropane	2018/10/17	7.3		%	25
			Bromomethane	2018/10/17	NC		%	25
			Bromoform	2018/10/17	NC		%	25
			Trichloroethylene	2018/10/17	NC		%	25
			Tetrachloroethylene	2018/10/17	NC		%	25
			Benzene	2018/10/17	2.4		%	25
			Toluene	2018/10/17	4.7		%	25
			Ethylbenzene	2018/10/17	NC		%	25
			p+m-Xylene	2018/10/17	NC		%	25
			o-Xylene	2018/10/17	NC		%	25
			Styrene	2018/10/17	NC		%	25
			Chlorobenzene	2018/10/17	NC		%	25
			Total Xylenes	2018/10/17	NC		%	25
			1,1,1,2-Tetrachloroethane	2018/10/17	NC		%	25
5791122	J-M	Spiked Blank	Cumene (Isopropylbenzene)	2018/10/17		109	%	N/A
5791122	J-M	Method Blank	Cumene (Isopropylbenzene)	2018/10/17	ND, RDL=0.50		ppbv	
5791122	J-M	RPD - Sample/Sample Dup	Cumene (Isopropylbenzene)	2018/10/17	NC		%	25

N/A = Not Applicable

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B8Q4860
Report Date: 2018/10/22

RWDI Air Inc
Client Project #: 1804600
Site Location: ST MARYS AMBIENT
Your P.O. #: 1804600
Sampler Initials: JDF

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Maureen Smith

Maureen Smith, Supervisor, Volatiles

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

06-Oct-18 10:50
Clayton Johnson
B8Q4860

KK4 AIR-001

Form - Summa™ Canister

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Toll Free: 1-800-668-0639
Phone: (905) 817-5700
Fax: (905) 817-5777

CAM FCD-01302 /2 Page ___ of ___

INVOICE INFORMATION		REPORT INFORMATION	
Company Name:	RWDI	Company Name:	SAME
Contact Name	Kirk Easto	Project Manager:	
Address:	600 Southgate Drive	Address:	
E-mail:	kirk.easto@rwdi.com	E-mail:	
Ph:		Ph:	
Sampled by:	JDF		

ANALYSIS REQUESTED

Field Sample ID	Canister Serial #	Flow Regulator Serial #	Collection Date	START VACUUM (inches of Hg)	END VACUUM (inches of Hg)	SOIL VAPOUR	AMBIENT/INDOOR AIR	AMBIENT/COMMERCIAL/INDUSTRIAL	SUB-SLAB GAS	FULL LIST OF VOCs (reference TO15A)	Aromatic/Aliphatic Hydrocarbon Fractions	F1 (C6-C10) and F2 (C10-C16)	Selected VOC's - please specify	Other				CANISTERS NOT USED
OPG - September 30	17358	FX1357	2018/09/30	-27	-10		A	A		x								
Cove - September 30	17986	FX1403	2018/09/30	-29	-10		A	A		x								
Beach - September 30	23463	FX1314	2018/09/30	-31	-10		A	A		x								
OPG - October 1	13930	FX1357	2018/10/01	-31	-5		A	A		x								
Cove - October 01	16+18	FX1403	2018/10/01	-29	-6		A	A		x								
Beach - October 01	23473	FX1314	2018/10/01	-27	-5		A	A		x								
OPG - October 02	1616	FX1357	2018/10/02	-30	-5		A	A		x								
Cove - October 02	116+08	FX1403	2018/10/02	-28	-6		A	A		x								
Beach - October 02	5838	FX1314	2018/10/02	-29	-6		A	A		x								
OPG - October 03	15296	FX1357	2018/10/03	-28	-5		A	A		x								
Cove - October 03	11380	FX1403	2018/10/03	-29	-5		A	A		x								
Beach - October 03	11635	FX1314	2018/10/03	-28	-5		A	A		x								

TAT Requirement

- STD 10 Business day ☐
- Rush 5 Business day * ☐
- Rush 2 Business day * ☐
- Rush Other * ☐

* need approval from Maxxam

PROJECT INFORMATION

Project #: 1804600
Name: St Marys Ambient
PO #: 1804600
Maxxam Quote #:
Maxxam Contact:
Task Order/Line Item

REPORTING REQUIREMENTS

EDD ☐
Regulations ON 153 ☐
ON 419 ☐
BC CSR ☐
Other

Notes

1) please indicate on chain of custody if your samples are soil vapour or ambient air
2) please list all canisters on the chain of custody even if unused

PROJECT SPECIFIC COMMENTS

See parameter list from Kirk Easto

Client Signature:
Date/Time:

Received by: [illegible]
Date/Time: 2018/10/06 10:50

PLEASE RETURN ALL UNUSED EQUIPMENT

APPENDIX H

PS1 Magnehelic Gauge Calibrations

Date 11-Sep-18

Calibration Temperature	295.2 K	**Tref**	283 K
Calibration Pressure	101.0 kPa	**Pref**	101.325 kPa

Orifice Calibration Data

Based on Rotek orifice cal

Calibration Regression Output:

Constant	**0.11**
X Coefficient(s)	**3.58**

y= 3.58 i+ 0.11

Sampler ID. OPG

Site Location Rotek

Motor Serial No. ______

Orifice Pressure ("H20)	Orifice i ("H2O^0.5)	Orifice Flow [1,2] (cfm)	Magnehelic Pressure ("H20)	Magnehelic i ("H2O^0.5)	Magnehelic Flow [1,2] (cfm)
6.82	2.55	9.25	60.00	7.57	9.34
5.92	2.38	8.62	50.00	6.91	8.56
4.75	2.13	7.74	40.00	6.18	7.69
3.59	1.85	6.74	30.00	5.35	6.71
2.36	1.50	5.49	20.00	4.37	5.54

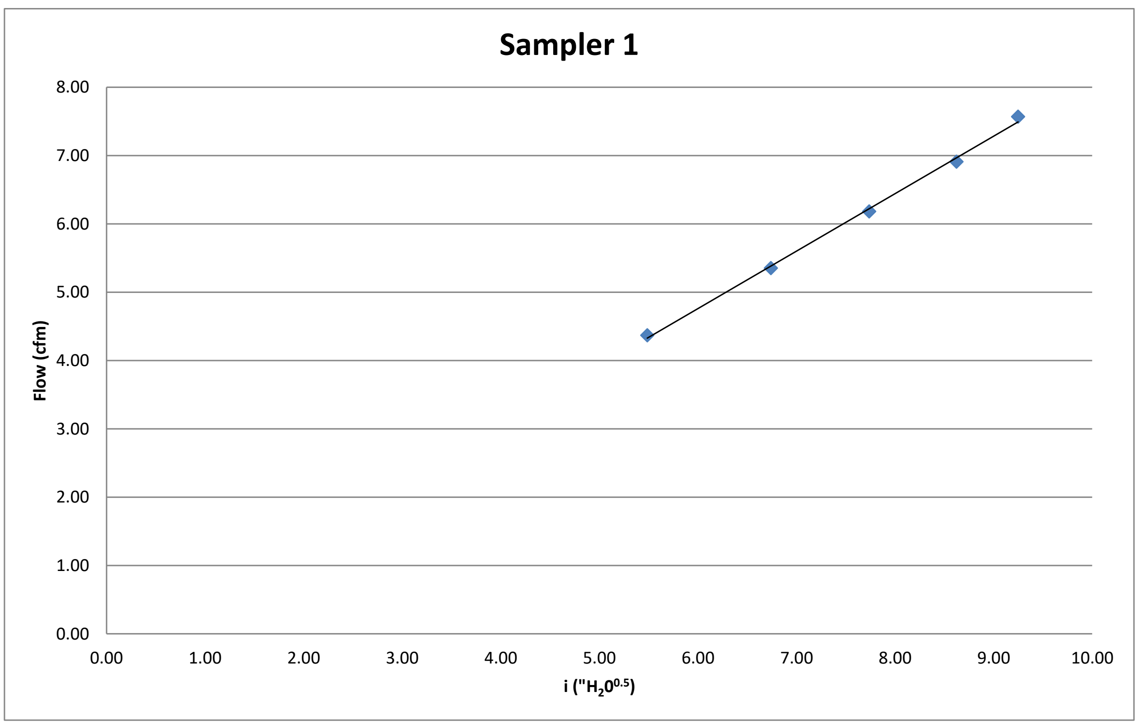
Orifice: [1] Based on Orifice Calibration Regression; [2] Flows are corrected to reference conditions

Magnehelic: [1] Based on actual calibration regression; [2] Flows are corrected to reference conditions

Calibration Regression Output:

Constant	0.36
Std Err of Y Est	0.08
R Squared	1.00
No. of Observations	5.00
Degrees of Freedom	3.00
X Coefficient(s)	1.19
Std Err of Coef.	0.03

y= 1.19 i + 0.36



Done By: ______

Reviewed By: ______

PS1 Magnehelic Gauge Calibrations

Date 11-Sep-18

Calibration Temperature	295.2 K	**Tref**	283 K
Calibration Pressure	101.0 kPa	**Pref**	101.325 kPa

Orifice Calibration Data

Based on Rotek orifice cal

Calibration Regression Output:

Constant	**0.11**
X Coefficient(s)	**3.58**

y= 3.58 i+ 0.11

Sampler ID. Cove

Site Location Rotek

Motor Serial No. ______

Orifice Pressure ("H20)	Orifice i ("H2O^0.5)	Orifice Flow [1,2] (cfm)	Magnehelic Pressure ("H20)	Magnehelic i ("H2O^0.5)	Magnehelic Flow [1,2] (cfm)
7.11	2.61	9.44	60.00	7.57	9.58
6.28	2.45	8.88	50.00	6.91	8.81
5.20	2.23	8.09	40.00	6.18	7.96
3.93	1.94	7.05	30.00	5.35	7.00
2.60	1.58	5.75	20.00	4.37	5.86

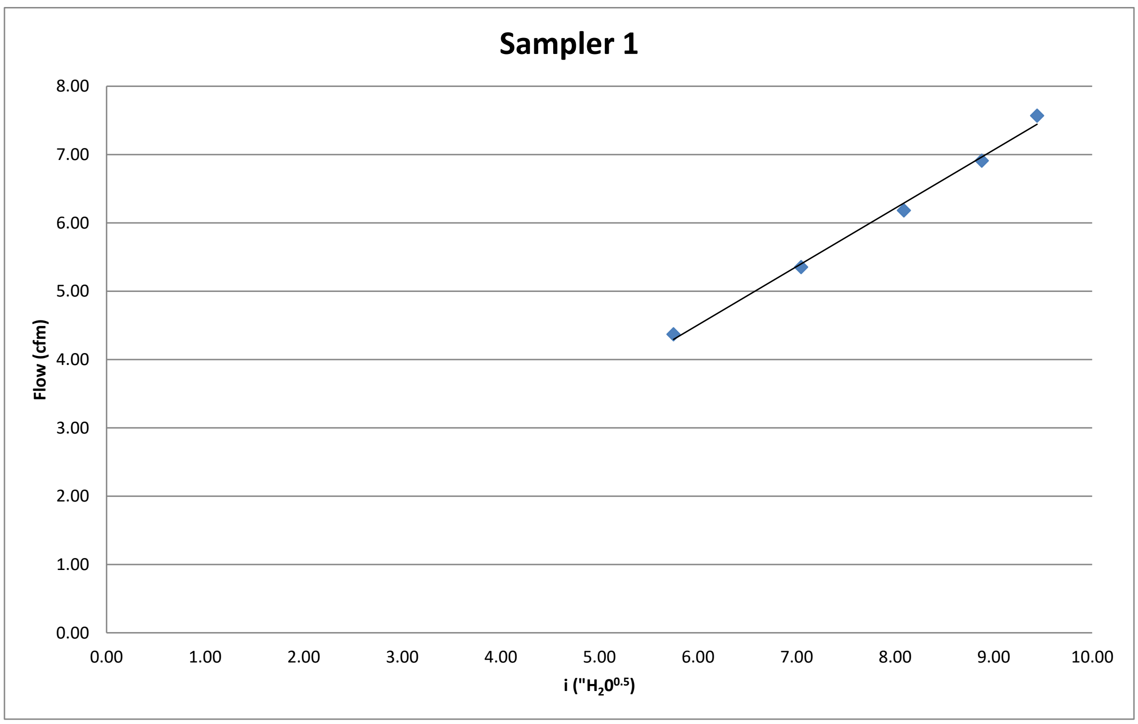
Orifice: [1] Based on Orifice Calibration Regression
[2] Flows are corrected to reference conditions

Magnehelic: [1] Based on actual calibration regression
[2] Flows are corrected to reference conditions

Calibration Regression Output:

Constant	0.77
Std Err of Y Est	0.13
R Squared	0.99
No. of Observations	5.00
Degrees of Freedom	3.00
X Coefficient(s)	1.16
Std Err of Coef.	0.05

y= 1.16 i + 0.77



Done By: ______

Reviewed By: ______

PS1 Magnehelic Gauge Calibrations

Date 11-Sep-18

Calibration Temperature	295.2 K	**Tref**	283 K
Calibration Pressure	101.0 kPa	**Pref**	101.325 kPa

Orifice Calibration Data

Based on Rotek orifice cal

Calibration Regression Output:

Constant	**0.11**
X Coefficient(s)	**3.58**

y= 3.58 i+ 0.11

Sampler ID. Beach

Site Location Rotek

Motor Serial No. ______

Orifice Pressure ("H20)	Orifice i ("H2O^0.5)	Orifice Flow [1,2] (cfm)	Magnehelic Pressure ("H20)	Magnehelic i ("H2O^0.5)	Magnehelic Flow [1,2] (cfm)
7.15	2.61	9.47	60.00	7.57	9.56
6.12	2.42	8.77	50.00	6.91	8.73
4.95	2.17	7.90	40.00	6.18	7.82
3.68	1.88	6.82	30.00	5.35	6.78
2.35	1.50	5.47	20.00	4.37	5.55

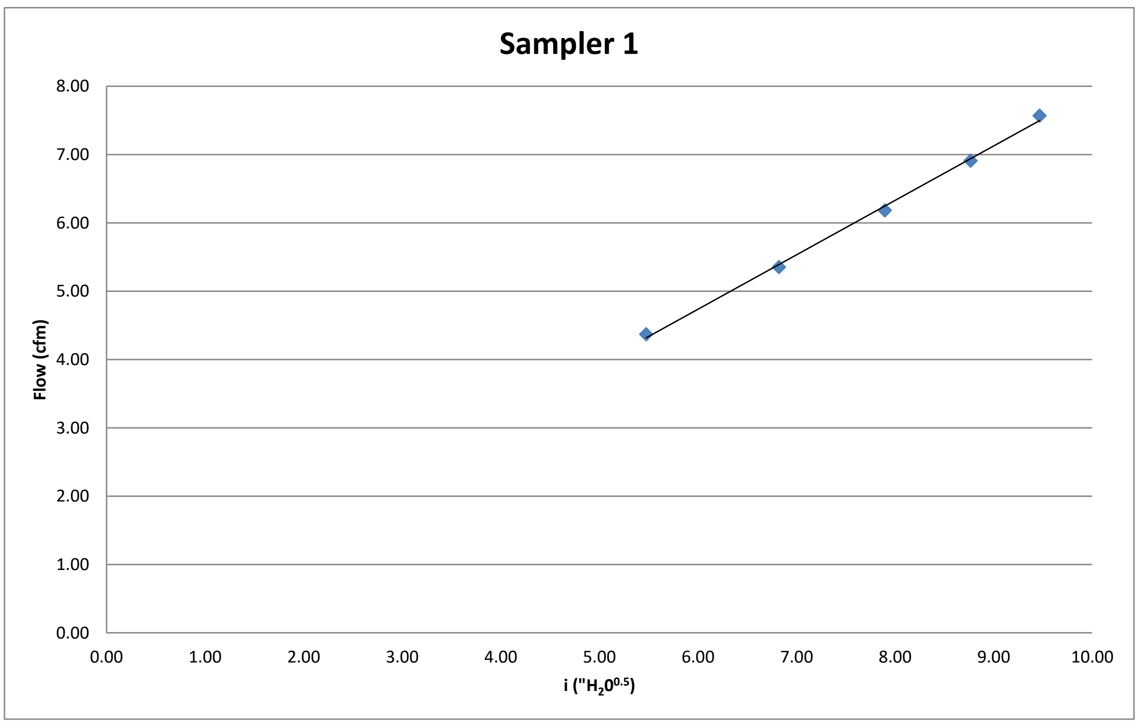
Orifice: [1] Based on Orifice Calibration Regression; [2] Flows are corrected to reference conditions

Magnehelic: [1] Based on actual calibration regression; [2] Flows are corrected to reference conditions

Calibration Regression Output:

Constant	0.07
Std Err of Y Est	0.09
R Squared	1.00
No. of Observations	5.00
Degrees of Freedom	3.00
X Coefficient(s)	1.25
Std Err of Coef.	0.03

y= 1.25 i + 0.07



Done By: ______

Reviewed By: ______

Hi-Vol Magnehelic Gauge Calibrations

Station: OPG
Date: 29-Sep-18

Calibration Temperature	285.25 K	**Tref**	283 K
Calibration Pressure	101.8 kPa	**Pref**	101.325 kPa

Orifice Calibration Data

Pressure ("H20)	i ("H2O^0.5)	Flow[1,3] (cfm)	Flow[2,3] (cfm)
1.5	1.19	26.27	26.31
2.5	1.54	33.85	33.88
3	1.68	37.10	37.09
3.5	1.82	40.15	40.03
6	2.38	52.27	52.32

[1] Based on Calibration from Tisch (manufacturer of Orifice)
[2] Based on regression from calibrated orifice
[3] Flows are corrected to reference conditions

Calibration Regression Output:

Constant	**0.31**
Std Err of Y Est	0.08
R Squared	1.00
No. of Observations	5
Degrees of Freedom	3
X Coefficient(s)	**21.85**
Std Err of Coef.	0.09

y= 21.85 i + 0.31

Sampler ID.
Site Location
Motor Serial No.

Orifice Pressure ("H20)	Orifice i ("H2O^0.5)	Orifice Flow [1,2] (cfm)	Magnehelic Pressure ("H20)	Magnehelic i ("H2O^0.5)	Magnehelic Flow [1,2] (cfm)
2.50	1.58	34.80	2.27	1.50	35.23
3.00	1.73	38.10	2.58	1.60	37.51
3.50	1.87	41.12	3.13	1.77	41.17
4.00	2.00	43.94	3.60	1.89	44.03
4.50	2.12	46.59	4.05	2.01	46.62

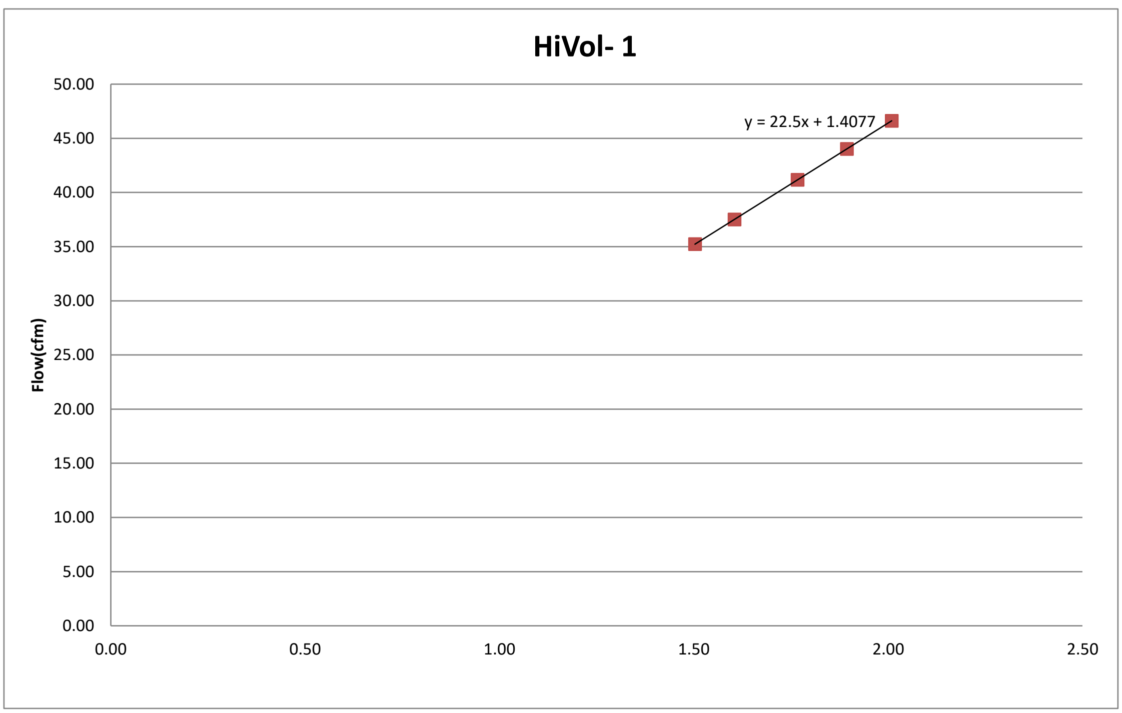
Orifice:
[1] Based on Orifice Calibration Regression
[2] Flows are corrected to reference conditions

Magnehelic:
[1] Based on actual calibration regression
[2] Flows are corrected to reference conditions

Calibration Regression Output:

Constant	1.41
Std Err of Y Est	0.42
R Squared	0.99
No. of Observations	5.00
Degrees of Freedom	3.00
X Coefficient(s)	22.50
Std Err of Coef.	1.02

y= 22.50 i + 1.41



Done By: JDF
Reviewed By:

Hi-Vol Magnehelic Gauge Calibrations

Station: Cove
Date: 1-Oct-18

Calibration Temperature	282.25 K		**Tref**	283 K
Calibration Pressure	101.8 kPa		**Pref**	101.325 kPa

Orifice Calibration Data

Pressure ("H20)	i ("H2O^0.5)	Flow[1,3] (cfm)	Flow[2,3] (cfm)
1.5	1.19	26.27	26.31
2.5	1.54	33.85	33.88
3	1.68	37.10	37.09
3.5	1.82	40.15	40.03
6	2.38	52.27	52.32

[1] Based on Calibration from Tisch (manufacturer of Orifice)
[2] Based on regression from calibrated orifice
[3] Flows are corrected to reference conditions

Calibration Regression Output:

Constant	**0.31**
Std Err of Y Est	0.08
R Squared	1.00
No. of Observations	5
Degrees of Freedom	3
X Coefficient(s)	**21.85**
Std Err of Coef.	0.09

y= 21.85 i + 0.31

Sampler ID.
Site Location
Motor Serial No.

Orifice Pressure ("H20)	Orifice i ("H2O^0.5)	Orifice Flow [1,2] (cfm)	Magnehelic Pressure ("H20)	Magnehelic i ("H2O^0.5)	Magnehelic Flow [1,2] (cfm)
2.50	1.59	34.99	2.25	1.51	35.00
3.00	1.74	38.30	2.70	1.65	38.27
3.50	1.88	41.34	3.20	1.80	41.60
4.00	2.01	44.17	3.55	1.89	43.78
4.50	2.13	46.84	4.10	2.03	46.99

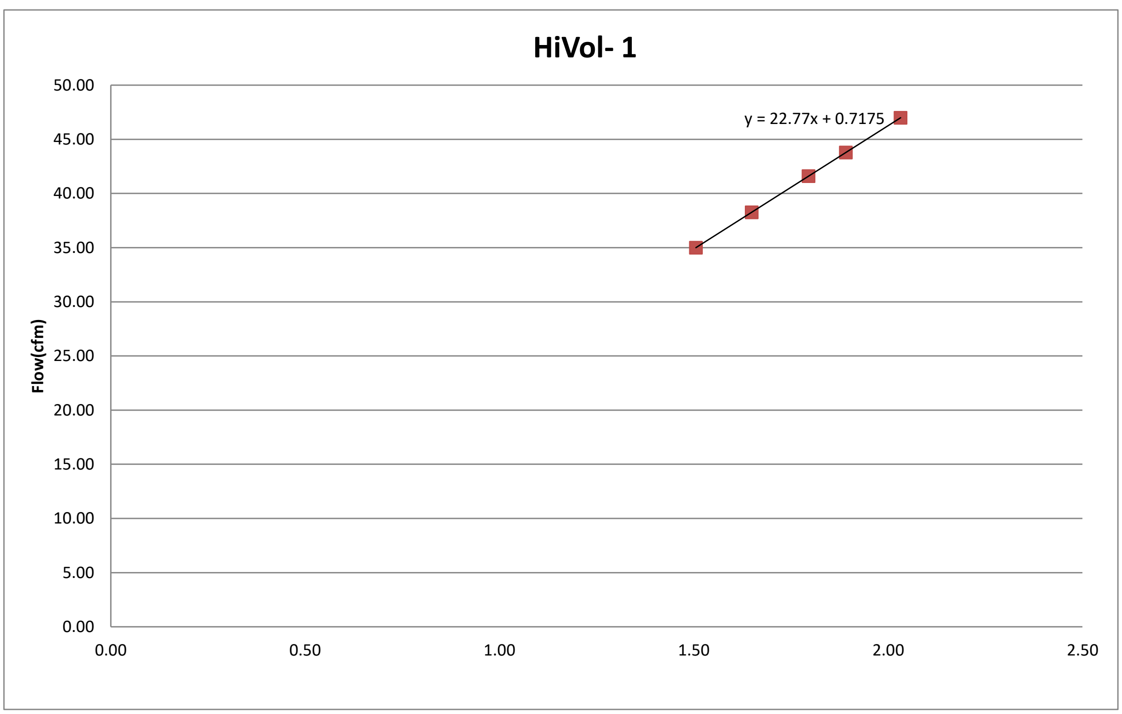
Orifice:
[1] Based on Orifice Calibration Regression
[2] Flows are corrected to reference conditions

Magnehelic:
[1] Based on actual calibration regression
[2] Flows are corrected to reference conditions

Calibration Regression Output:

Constant	0.72
Std Err of Y Est	0.29
R Squared	1.00
No. of Observations	5.00
Degrees of Freedom	3.00
X Coefficient(s)	22.77
Std Err of Coef.	0.70

y= 22.77 i + 0.72



Done By: JDF
Reviewed By:

Hi-Vol Magnehelic Gauge Calibrations

Station: OPG
Date: 29-Sep-18

Calibration Temperature	285.25 K		**Tref**	283 K
Calibration Pressure	101.8 kPa		**Pref**	101.325 kPa

Orifice Calibration Data

Pressure ("H20)	**i ("H2O^0.5)**	**Flow[1,3] (cfm)**	**Flow[2,3] (cfm)**
1.5	1.19	26.27	26.31
2.5	1.54	33.85	33.88
3	1.68	37.10	37.09
3.5	1.82	40.15	40.03
6	2.38	52.27	52.32

[1] Based on Calibration from Tisch (manufacturer of Orifice)
[2] Based on regression from calibrated orifice
[3] Flows are corrected to reference conditions

Calibration Regression Output:

Constant	**0.31**
Std Err of Y Est	0.08
R Squared	1.00
No. of Observations	5
Degrees of Freedom	3
X Coefficient(s)	**21.85**
Std Err of Coef.	0.09

y= 21.85 i + 0.31

Sampler ID.
Site Location
Motor Serial No.

Orifice Pressure ("H20)	**Orifice i ("H2O^0.5)**	**Orifice Flow [1,2] (cfm)**	**Magnehelic Pressure ("H20)**	**Magnehelic i ("H2O^0.5)**	**Magnehelic Flow [1,2] (cfm)**
2.50	1.58	34.80	2.27	1.50	35.23
3.00	1.73	38.10	2.58	1.60	37.51
3.50	1.87	41.12	3.13	1.77	41.17
4.00	2.00	43.94	3.60	1.89	44.03
4.50	2.12	46.59	4.05	2.01	46.62

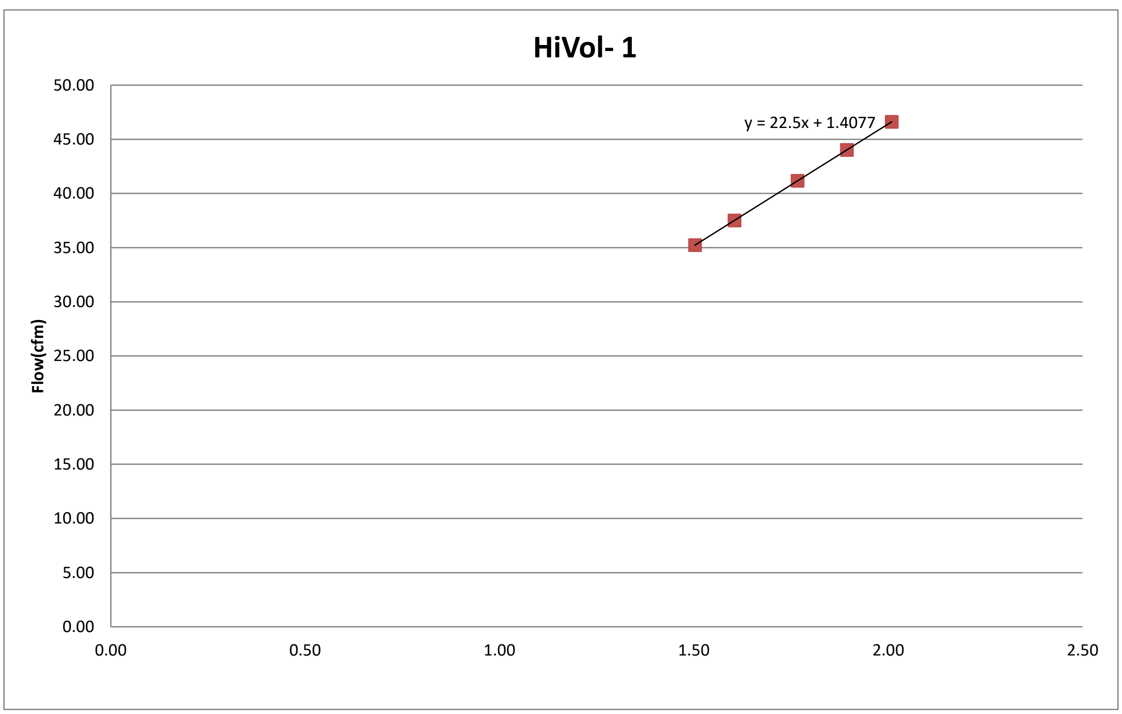
Orifice:
[1] Based on Orifice Calibration Regression
[2] Flows are corrected to reference conditions

Magnehelic:
[1] Based on actual calibration regression
[2] Flows are corrected to reference conditions

Calibration Regression Output:

Constant	1.41
Std Err of Y Est	0.42
R Squared	0.99
No. of Observations	5.00
Degrees of Freedom	3.00
X Coefficient(s)	22.50
Std Err of Coef.	1.02

y= 22.50 i + 1.41



Done By: JDF
Reviewed By:

Hi-Vol Magnehelic Gauge Calibrations

Station: Beach
Date: 29-Sep-18

Calibration Temperature	283 K	**Tref**	283 K
Calibration Pressure	101.3 kPa	**Pref**	101.325 kPa

Orifice Calibration Data

Pressure ("H20)	i ("H2O^0.5)	Flow[1,3] (cfm)	Flow[2,3] (cfm)
1.5	1.19	26.27	26.31
2.5	1.54	33.85	33.88
3	1.68	37.10	37.09
3.5	1.82	40.15	40.03
6	2.38	52.27	52.32

[1] Based on Calibration from Tisch (manufacturer of Orifice)
[2] Based on regression from calibrated orifice
[3] Flows are corrected to reference conditions

Calibration Regression Output:

Constant	**0.31**
Std Err of Y Est	0.08
R Squared	1.00
No. of Observations	5
Degrees of Freedom	3
X Coefficient(s)	**21.85**
Std Err of Coef.	0.09

y= 21.85 i + 0.31

Sampler ID.
Site Location
Motor Serial No.

Orifice Pressure ("H20)	Orifice i ("H2O^0.5)	Orifice Flow [1,2] (cfm)	Magnehelic Pressure ("H20)	Magnehelic i ("H2O^0.5)	Magnehelic Flow [1,2] (cfm)
2.50	1.58	34.86	2.76	1.66	35.07
3.00	1.73	38.16	3.27	1.81	38.02
3.50	1.87	41.19	3.80	1.95	40.90
4.00	2.00	44.01	4.46	2.11	44.22
4.50	2.12	46.66	4.99	2.23	46.68

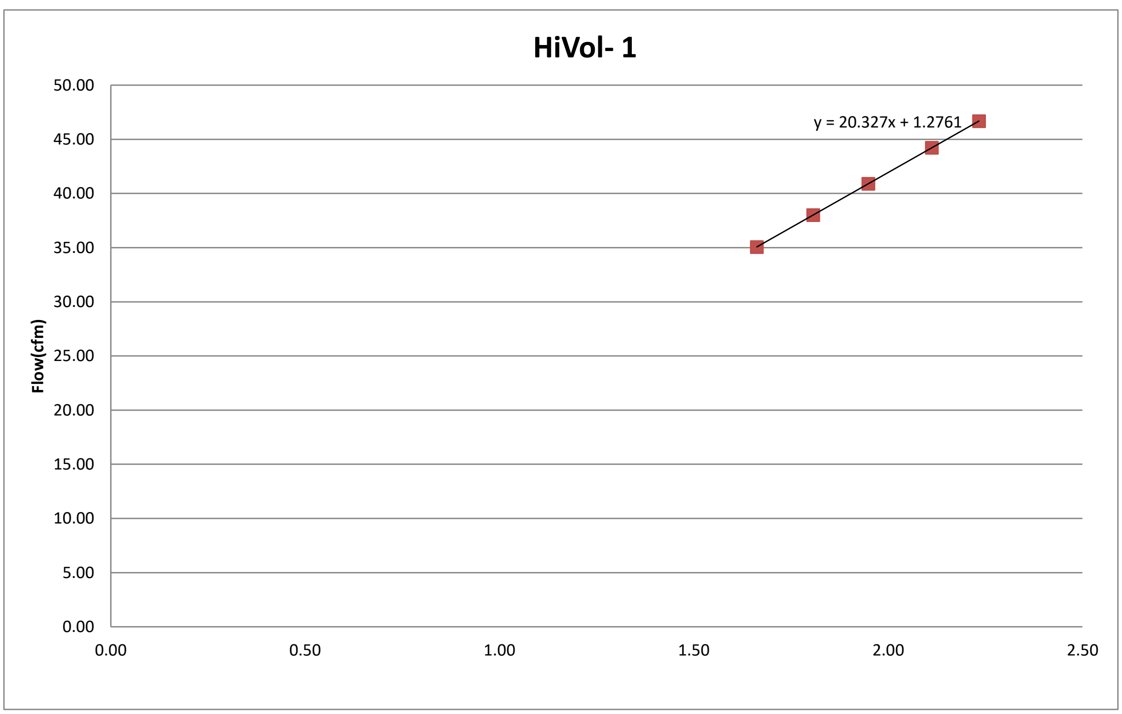
Orifice:
[1] Based on Orifice Calibration Regression
[2] Flows are corrected to reference conditions

Magnehelic:
[1] Based on actual calibration regression
[2] Flows are corrected to reference conditions

Calibration Regression Output:

Constant	1.28
Std Err of Y Est	0.25
R Squared	1.00
No. of Observations	5.00
Degrees of Freedom	3.00
X Coefficient(s)	20.33
Std Err of Coef.	0.55

y= 20.33 i + 1.28



Done By: JDF
Reviewed By:

Rotek Environmental Field Audit

TSP

Station Number	: 10083	**Audit Date**	: September 20, 2018
Station Location	: Rotek Shop	**Audit Time**	: 12:30:00
Easting Co-ordinates	: N/A	**Audit Criteria**	: **PASS**
Northing Co-ordinates	: N/A		

Client Company	**Client Contact Name**	**Client Contact Number**
RWDI	Joe Frost	289-979-8947
Auditor Name	**Auditor Contact Number**	**Auditor Signature**
Nik Zelinski	905-573-9533	

TSP Sampler Information

Instrument Make	**Instrument Model**	**Instrument Serial Number**
Tisch	TE-5170	10083
TE-300-310 Flow Controller SN	**TE-5007 Timer SN**	**TE-5005 Motor SN**
2486	3880	0691
TE-5009 Flow Recorder SN	**TE-5012 ETI SN**	**ETI Reading As Left**
N/A	2222	7032.13

Calibration Equipment

Calibration Orifice	**Calibration Orifice Serial Number**	**Certification Expiration Date**
Tisch TE-5028A	1148	October 30, 2018
Qstd Slope Value (m)	**Intercept Value (b)**	**Coefficient Value (r)**
1.57502	-0.01926	0.99989
Temperature Calibrator	**Temperature Calibrator SN**	**Certification Expiration Date**
BGI TriCal	275	June 29, 2019
Pressure Calibrator	**Pressure Calibrator SN**	**Certification Expiration Date**
BGI TriCal	275	June 29, 2019

Audit Results

Measured Temperature (DegC)	**Measured Pressure (mmHg)**	**Manometer Reading (inH$_2$0)**
20.6	759.0	3.14
Calculated Flow (cfm)	**Calculated Tolerance (%)**	**Siting Criteria**
40.43	1.07	N/A
Flow Chart Reading (cfm)	**Gasket Inspection**	**Cleanliness of Equipment**
N/A	Good	Good
Electrical Inspection	**Mechanical Inspection**	**Sensor Height**
Good	Good	42"

Comments / Recommendations

Sampler meets criteria.
Rental unit includes two TE-3000 Filter Media Holders with Covers.

Rotek Environmental Field Audit

TSP

Station Number	: 10135	**Audit Date**	: September 20, 2018
Station Location	: Rotek Shop	**Audit Time**	: 12:45:00
Easting Co-ordinates	: N/A	**Audit Criteria**	: **PASS**
Northing Co-ordinates	: N/A		

Client Company	**Client Contact Name**	**Client Contact Number**
RWDI	Joe Frost	289-979-8947
Auditor Name	**Auditor Contact Number**	**Auditor Signature**
Nik Zelinski	905-573-9533	

TSP Sampler Information

Instrument Make	**Instrument Model**	**Instrument Serial Number**
Tisch	TE-5170	10135
TE-300-310 Flow Controller SN	**TE-5007 Timer SN**	**TE-5005 Motor SN**
2460	1257	2369
TE-5009 Flow Recorder SN	**TE-5012 ETI SN**	**ETI Reading As Left**
N/A	3396	1270.93

Calibration Equipment

Calibration Orifice	**Calibration Orifice Serial Number**	**Certification Expiration Date**
Tisch TE-5028A	1148	October 30, 2018
Qstd Slope Value (m)	**Intercept Value (b)**	**Coefficient Value (r)**
1.57502	-0.01926	0.99989
Temperature Calibrator	**Temperature Calibrator SN**	**Certification Expiration Date**
BGI TriCal	275	June 29, 2019
Pressure Calibrator	**Pressure Calibrator SN**	**Certification Expiration Date**
BGI TriCal	275	June 29, 2019

Audit Results

Measured Temperature (DegC)	**Measured Pressure (mmHg)**	**Manometer Reading (inH$_2$0)**
20.6	759.0	3.12
Calculated Flow (cfm)	**Calculated Tolerance (%)**	**Siting Criteria**
40.30	0.75	N/A
Flow Chart Reading (cfm)	**Gasket Inspection**	**Cleanliness of Equipment**
N/A	Good	Good
Electrical Inspection	**Mechanical Inspection**	**Sensor Height**
Good	Good	42"

Comments / Recommendations

Sampler meets criteria.
Rental unit includes two TE-3000 Filter Media Holders with Covers.

Rotek Environmental Field Audit

TSP

Station Number	: 10163		**Audit Date**	: September 20, 2018	
Station Location	: Rotek Shop		**Audit Time**	: 13:00:00 PM	
Easting Co-ordinates	: N/A		**Audit Criteria**	: **PASS**	
Northing Co-ordinates	: N/A				

Client Company	**Client Contact Name**	**Client Contact Number**
RWDI	Joe Frost	289-979-8947
Auditor Name	**Auditor Contact Number**	**Auditor Signature**
Nik Zelinski	905-573-9533	

TSP Sampler Information

Instrument Make	**Instrument Model**	**Instrument Serial Number**
Tisch	TE-5170	10163
TE-300-310 Flow Controller SN	**TE-5007 Timer SN**	**TE-5005 Motor SN**
2928	5186	3961
TE-5009 Flow Recorder SN	**TE-5012 ETI SN**	**ETI Reading As Left**
N/A	3283	2053.01

Calibration Equipment

Calibration Orifice	**Calibration Orifice Serial Number**	**Certification Expiration Date**
Tisch TE-5028A	1148	October 30, 2018
Qstd Slope Value (m)	**Intercept Value (b)**	**Coefficient Value (r)**
1.57502	-0.01926	0.99989
Temperature Calibrator	**Temperature Calibrator SN**	**Certification Expiration Date**
BGI TriCal	275	June 29, 2019
Pressure Calibrator	**Pressure Calibrator SN**	**Certification Expiration Date**
BGI TriCal	275	June 29, 2019

Audit Results

Measured Temperature (DegC)	**Measured Pressure (mmHg)**	**Manometer Reading (inH$_2$0)**
20.6	759.0	3.10
Calculated Flow (cfm)	**Calculated Tolerance (%)**	**Siting Criteria**
40.17	0.43	N/A
Flow Chart Reading (cfm)	**Gasket Inspection**	**Cleanliness of Equipment**
N/A	Good	Good
Electrical Inspection	**Mechanical Inspection**	**Sensor Height**
Good	Good	42"

Comments / Recommendations

Sampler meets criteria.
Rental unit includes two TE-3000 Filter Media Holders with Covers.

Rotek Environmental Field Audit **PUF**

Station Number	: 10127	**Audit Date**	: September 11, 2018
Station Location	: Rotek Shop	**Audit Time**	: 14:30 EST
Easting Co-ordinates	: N/A	**Audit Criteria**	: **PASS**
Northing Co-ordinates	: N/A		

Client Company : RWDI	**Client Contact Name :** Joe Frost	**Client Contact Number :** 289-979-8947
Auditor Name : Nik Zelinski	**Auditor Contact Number :** 905-573-9533	**Auditor Signature :**

PUF Sampler Information

Instrument Make : Tisch	**Instrument Model :** TE-1000	**Sensor Height :** 42"
TE-1004 Motor SN : 0117	**TE-5007 Timer SN :** 1543	**TE-5010 ETI SN :** 0949
Electrical / Mechanical Inspection : Good	**Cleanliness of Equipment :** Good	**ETI Reading As Left :** 2432.96

Calibration Equipment

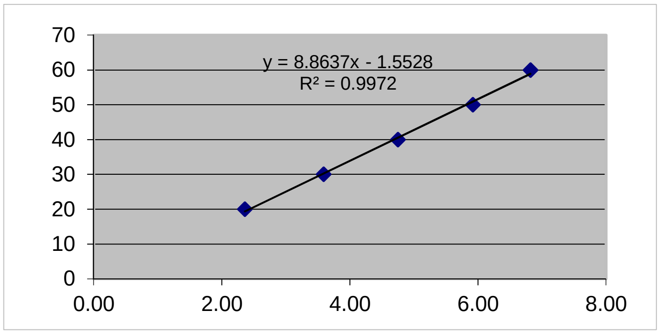
Calibration Orifice : Tisch TE-5040A	**Calibration Orifice SN :** 3485	**Certification Expiration Date :** April 25, 2019
Qstd Slope Value (m) : 9.86594	**Qstd Intercept Value (b) :** -0.03137	**Manometer SN :** 141090-R4
Temperature / Pressure Calibrator : BGI TriCal	**Temperature / Pressure Calibrator SN :** 275	**Certification Expiration Date** June 29, 2019

Audit Results

Measured Temperature (˚C) : 22.2	**Corrected Temperature (˚K) :** 295.2	**Measured Pressure (mmHg) :** 757.5

Calibration

Flow Set Point (Magn)	Flow (Corrected)	H2O (in)	QStd (m3/min)
60	7.77	6.82	0.269
50	7.09	5.92	0.251
40	6.34	4.75	0.225
30	5.49	3.59	0.196
20	4.49	2.36	0.159



Linear Regression

Slope = 29.7087	**Intercept =** -0.2938	**Corrected Coefficient =** 0.9989

Comments / Recommendations

Sampler meets criteria.
Rental Unit Includes; Exhaust Kit and TE-1002.
Rental Inlcudes; 8 Spare TE-1009 Glass Cartridges.

Rotek Environmental Field Audit **PUF**

Station Number	: 10128
Station Location	: Rotek Shop
Easting Co-ordinates	: N/A
Northing Co-ordinates	: N/A

Audit Date	: September 11, 2018
Audit Time	: 15:30 EST
Audit Criteria	: **PASS**

Client Company : RWDI	**Client Contact Name :** Joe Frost	**Client Contact Number :** 289-979-8947
Auditor Name : Nik Zelinski	**Auditor Contact Number :** 905-573-9533	**Auditor Signature :**

PUF Sampler Information

Instrument Make : Tisch	**Instrument Model :** TE-1000	**Sensor Height :** 42"
TE-1004 Motor SN : 0513	**TE-5007 Timer SN :** 1571	**TE-5010 ETI SN :** 0950
Electrical / Mechanical Inspection : Good	**Cleanliness of Equipment :** Good	**ETI Reading As Left :** 2072.08

Calibration Equipment

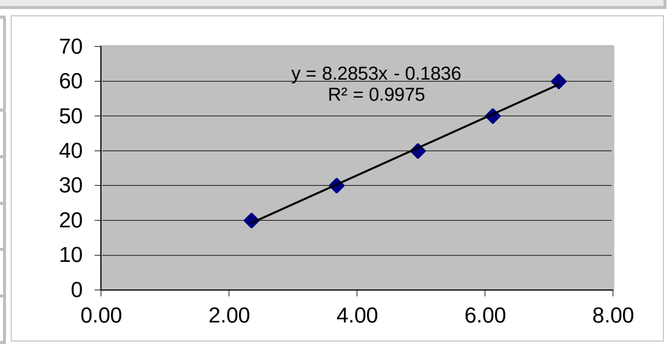
Calibration Orifice : Tisch TE-5040A	**Calibration Orifice SN :** 3485	**Certification Expiration Date :** April 25, 2019
Qstd Slope Value (m) : 9.86594	**Qstd Intercept Value (b) :** -0.03137	**Manometer SN :** 141090-R4
Temperature / Pressure Calibrator : BGI TriCal	**Temperature / Pressure Calibrator SN :** 275	**Certification Expiration Date** June 29, 2019

Audit Results

Measured Temperature (˚C) : 22.2	**Corrected Temperature (˚K) :** 295.2	**Measured Pressure (mmHg) :** 757.5

Calibration

Flow Set Point (Magn)	**Flow** (Corrected)	**H2O** (in)	**QStd** (m3/min)
60	7.77	7.15	0.275
50	7.09	6.12	0.255
40	6.34	4.95	0.229
30	5.49	3.68	0.198
20	4.49	2.35	0.159



Linear Regression

Slope = 28.1358	**Intercept =** -0.0447	**Corrected Coefficient =** 0.9988

Comments / Recommendations

Sampler meets criteria.
Rental Unit Includes; Exhaust Kit and TE-1002.
Rental Inlcudes; 8 Spare TE-1009 Glass Cartridges.

Rotek Environmental Field Audit

PUF

Station Number	: 1533	**Audit Date**	: September 21, 2018
Station Location	: Rotek Shop	**Audit Time**	: 14:45 EST
Easting Co-ordinates	: N/A	**Audit Criteria**	: **PASS**
Northing Co-ordinates	: N/A		

Client Company :	**Client Contact Name :**	**Client Contact Number :**
RWDI	Joe Frost	289-979-8947
Auditor Name :	**Auditor Contact Number :**	**Auditor Signature :**
Nik Zelinski	905-573-9533	

PUF Sampler Information

Instrument Make :	**Instrument Model :**	**Sensor Height :**
Tisch	TE-1000	42"
TE-1004 Motor SN :	**TE-5007 Timer SN :**	**TE-5010 ETI SN :**
1533	5349	Shawnee Instruments
Electrical / Mechanical Inspection :	**Cleanliness of Equipment :**	**ETI Reading As Left :**
Good	Good	8010.69

Calibration Equipment

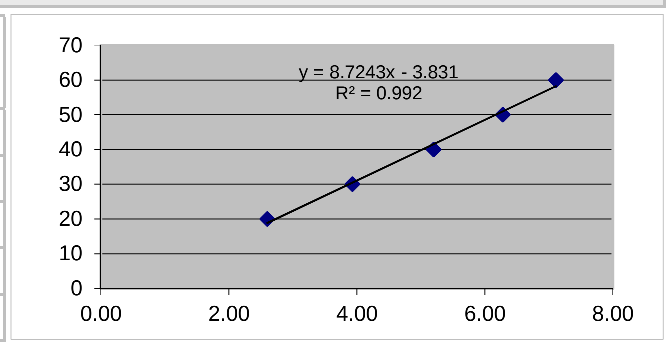
Calibration Orifice :	**Calibration Orifice SN :**	**Certification Expiration Date :**
Tisch TE-5040A	3485	April 25, 2019
Qstd Slope Value (m) :	**Qstd Intercept Value (b) :**	**Manometer SN :**
9.86594	-0.03137	141090-R4
Temperature / Pressure Calibrator :	**Temperature / Pressure Calibrator SN :**	**Certification Expiration Date**
BGI TriCal	275	June 29, 2019

Audit Results

Measured Temperature (˚C) :	**Corrected Temperature (˚K) :**	**Measured Pressure (mmHg) :**
27.0	300.0	746.0

Calibration

Flow Set Point (Magn)	Flow (Corrected)	H2O (in)	QStd (m3/min)
60	7.65	7.11	0.270
50	6.98	6.28	0.254
40	6.25	5.20	0.231
30	5.41	3.93	0.202
20	4.42	2.60	0.165



Linear Regression

Slope =	**Intercept =**	**Corrected Coefficient =**
30.1533	-0.6240	0.9970

Comments / Recommendations

Sampler meets criteria.
Rental Unit Includes; Exhaust Kit and TE-1002.
Rental Inlcudes; 8 Spare TE-1009 Glass Cartridges.

PS1 Magnehelic Gauge Calibrations

Date 9-Dec-18

Calibration Temperature	268.15 K	**Tref**	283 K
Calibration Pressure	101.1 kPa	**Pref**	101.325 kPa

Orifice Calibration Data

	Pressure ("H20)	i ("H2O^0.5)	Flow[1,3] (cfm)	Flow[2,3] (cfm)
Cal Date:	2.00	1.39	4.89	4.89
3-Feb-17	5.50	2.31	8.08	8.09
	8.50	2.87	10.04	10.05
	11.50	3.33	11.68	11.68
	14.50	3.74	13.15	13.11
	16.50	3.99	13.95	13.98

[1] Based on Calibration from Pacwill Environmental
[2] Based on regression from calibrated orifice
[3] Flows are corrected to reference conditions

Calibration Regression Output:

Constant	**0.04**
Std Err of Y Est	0.03
R Squared	1.00
No. of Observations	6.00
Degrees of Freedom	3.00
X Coefficient(s)	**3.49**
Std Err of Coef.	0.01

y= 3.49 i+ 0.04

Sampler ID.	OPG
Site Location	Bowmanville
Motor Serial No.	

Orifice

Pressure ("H20)	i ("H2O^0.5)	Flow [1,2] (cfm)
3.53	1.93	6.77
4.61	2.20	7.73
5.52	2.41	8.45
6.52	2.62	9.18
7.40	2.79	9.78

[1] Based on Orifice Calibration Regression
[2] Flows are corrected to reference conditions

Magnehelic

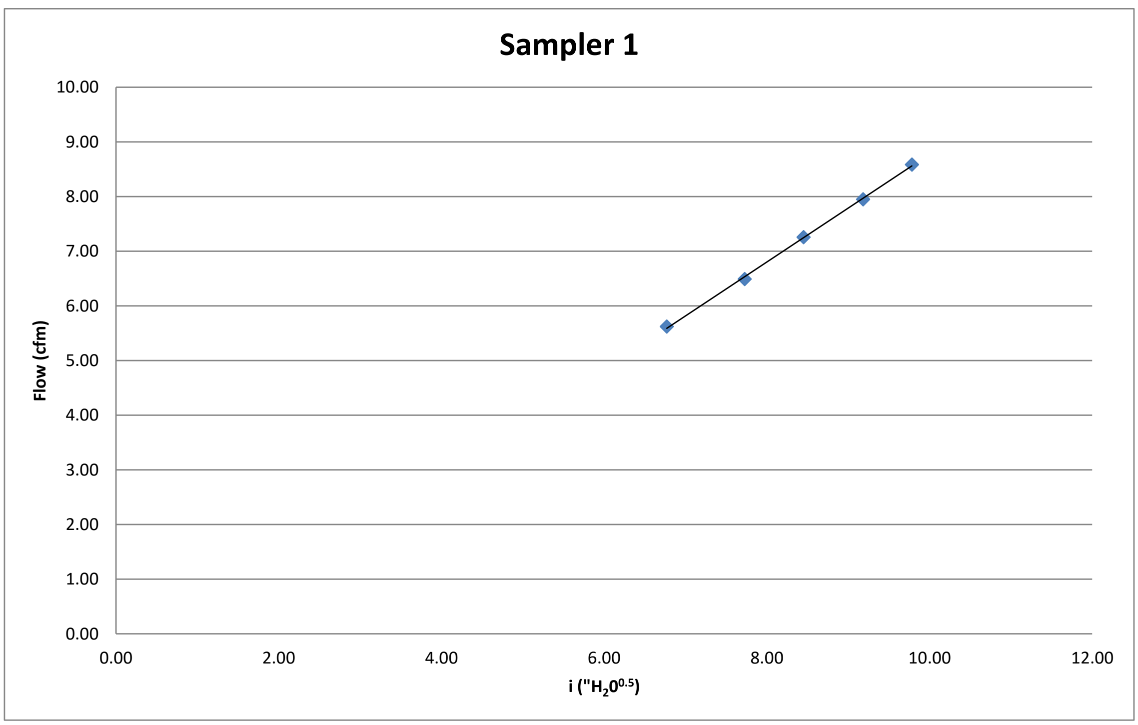
Pressure ("H20)	i ("H2O^0.5)	Flow [1,2] (cfm)
30.00	5.62	6.80
40.00	6.49	7.68
50.00	7.26	8.46
60.00	7.95	9.16
70.00	8.59	9.81

[1] Based on actual calibration regression
[2] Flows are corrected to reference conditions

Calibration Regression Output:

Constant	1.11
Std Err of Y Est	0.04
R Squared	1.00
No. of Observations	5.00
Degrees of Freedom	3.00
X Coefficient(s)	1.01
Std Err of Coef.	0.02

y= 1.01 i + 1.11



Done By: ______________________
Reviewed By: ______________________

PS1 Magnehelic Gauge Calibrations

Date 9-Dec-18

Calibration Temperature	270.15 K	**Tref**	283 K
Calibration Pressure	101.2 kPa	**Pref**	101.325 kPa

Orifice Calibration Data

	Pressure ("H20)	i ("H2O^0.5)	Flow[1,3] (cfm)	Flow[2,3] (cfm)
Cal Date:	2.00	1.39	4.89	4.89
3-Feb-17	5.50	2.31	8.08	8.09
	8.50	2.87	10.04	10.05
	11.50	3.33	11.68	11.68
	14.50	3.74	13.15	13.11
	16.50	3.99	13.95	13.98

[1] Based on Calibration from Pacwill Environmental
[2] Based on regression from calibrated orifice
[3] Flows are corrected to reference conditions

Calibration Regression Output:

Constant	**0.04**
Std Err of Y Est	0.03
R Squared	1.00
No. of Observations	6.00
Degrees of Freedom	3.00
X Coefficient(s)	**3.49**
Std Err of Coef.	0.01

y= 3.49 i+ 0.04

Sampler ID. Cove
Site Location Bowmanville
Motor Serial No. ______

Orifice

Pressure ("H20)	i ("H2O^0.5)	Flow [1,2] (cfm)
3.53	1.92	6.74
4.78	2.24	7.85
6.00	2.51	8.79
6.82	2.67	9.36
7.58	2.82	9.87

[1] Based on Orifice Calibration Regression
[2] Flows are corrected to reference conditions

Magnehelic

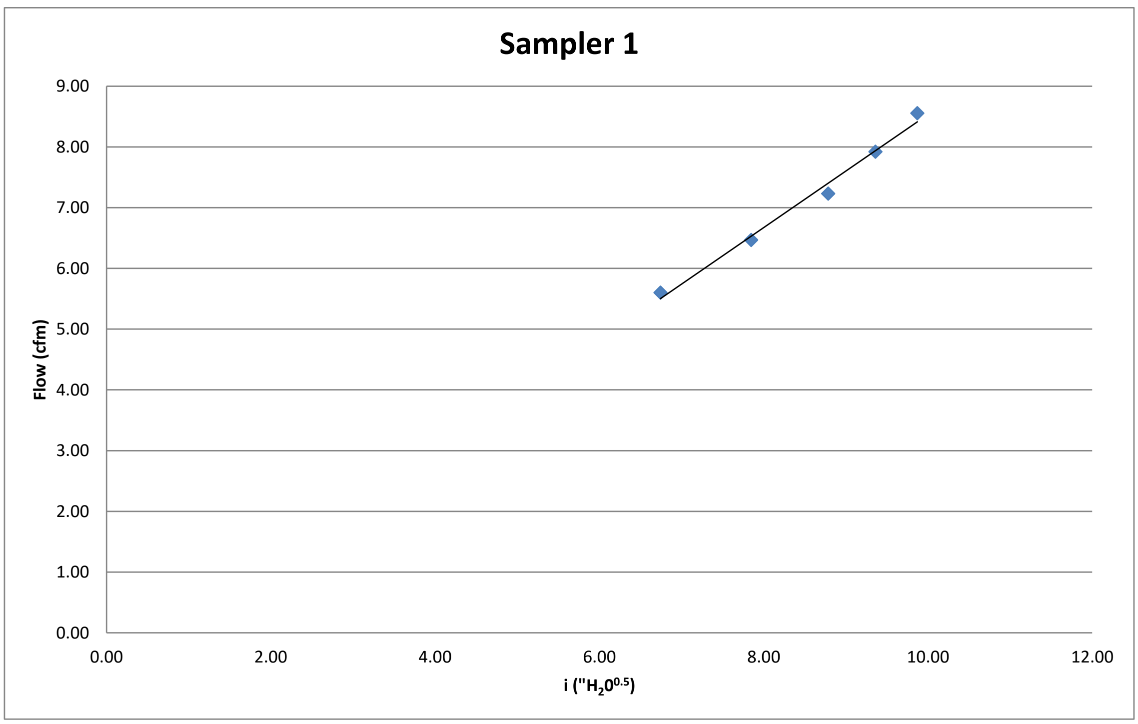
Pressure ("H20)	i ("H2O^0.5)	Flow [1,2] (cfm)
30.00	5.60	6.87
40.00	6.47	7.79
50.00	7.23	8.60
60.00	7.92	9.34
70.00	8.56	10.01

[1] Based on actual calibration regression
[2] Flows are corrected to reference conditions

Calibration Regression Output:

Constant	0.92
Std Err of Y Est	0.16
R Squared	0.99
No. of Observations	5.00
Degrees of Freedom	3.00
X Coefficient(s)	1.06
Std Err of Coef.	0.07

y= 1.06 i + 0.92



Done By: ______
Reviewed By: ______

PS1 Magnehelic Gauge Calibrations

Date 9-Dec-18

Calibration Temperature	266.35 K	**Tref**	283 K
Calibration Pressure	101.4 kPa	**Pref**	101.325 kPa

Orifice Calibration Data

	Pressure ("H20)	i ("H2O^0.5)	Flow[1,3] (cfm)	Flow[2,3] (cfm)
Cal Date:	2.00	1.39	4.89	4.89
3-Feb-17	5.50	2.31	8.08	8.09
	8.50	2.87	10.04	10.05
	11.50	3.33	11.68	11.68
	14.50	3.74	13.15	13.11
	16.50	3.99	13.95	13.98

[1] Based on Calibration from Pacwill Environmental
[2] Based on regression from calibrated orifice
[3] Flows are corrected to reference conditions

Calibration Regression Output:

Constant	**0.04**
Std Err of Y Est	0.03
R Squared	1.00
No. of Observations	6.00
Degrees of Freedom	3.00
X Coefficient(s)	**3.49**
Std Err of Coef.	0.01

y= 3.49 i+ 0.04

Sampler ID. Beach
Site Location Bowmanville
Motor Serial No. ______

Orifice Pressure ("H20)	Orifice i ("H2O^0.5)	Orifice Flow [1,2] (cfm)	Magnehelic Pressure ("H20)	Magnehelic i ("H2O^0.5)	Magnehelic Flow [1,2] (cfm)
3.00	1.79	6.27	30.00	5.65	6.37
4.15	2.10	7.37	40.00	6.52	7.34
5.32	2.38	8.34	50.00	7.29	8.19
6.21	2.57	9.00	60.00	7.99	8.97
7.01	2.73	9.57	70.00	8.63	9.68

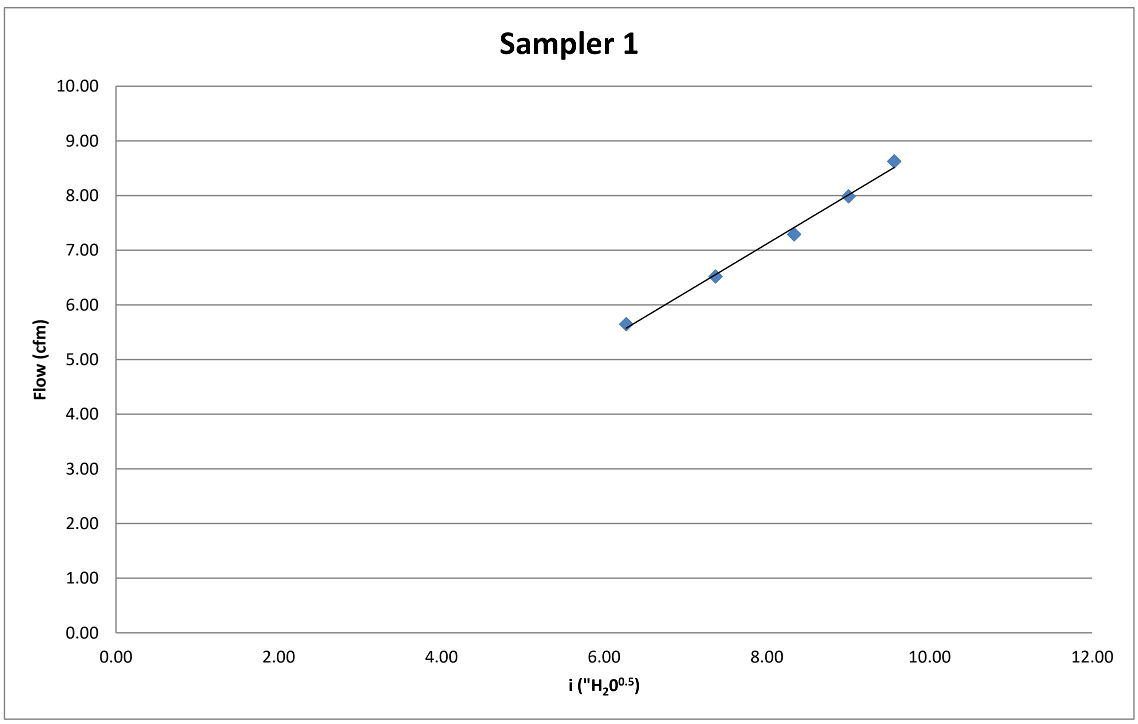
Orifice: [1] Based on Orifice Calibration Regression
[2] Flows are corrected to reference conditions

Magnehelic: [1] Based on actual calibration regression
[2] Flows are corrected to reference conditions

Calibration Regression Output:

Constant	0.08
Std Err of Y Est	0.12
R Squared	0.99
No. of Observations	5.00
Degrees of Freedom	3.00
X Coefficient(s)	1.11
Std Err of Coef.	0.05

y= 1.11 i + 0.08



Done By: ______
Reviewed By: ______

Hi-Vol Magnehelic Gauge Calibrations

Station: OPG
Date: 9-Dec-18

Calibration Temperature	268.15	K	**Tref**	283	K
Calibration Pressure	101.1	kPa	**Pref**	101.325	kPa

Orifice Calibration Data

Pressure ("H20)	**i ("H2O^0.5)**	**Flow[1,3] (cfm)**	**Flow[2,3] (cfm)**
1.5	1.19	26.27	26.31
2.5	1.54	33.85	33.88
3	1.68	37.10	37.09
3.5	1.82	40.15	40.03
6	2.38	52.27	52.32

[1] Based on Calibration from Tisch (manufacturer of Orifice)
[2] Based on regression from calibrated orifice
[3] Flows are corrected to reference conditions

Calibration Regression Output:

Constant	**0.31**
Std Err of Y Est	0.08
R Squared	1.00
No. of Observations	5
Degrees of Freedom	3
X Coefficient(s)	**21.85**
Std Err of Coef.	0.09

y= 21.85 i + 0.31

Sampler ID.
Site Location
Motor Serial No.

Orifice Pressure ("H20)	**Orifice i ("H2O^0.5)**	**Orifice Flow [1,2] (cfm)**	**Magnehelic Pressure ("H20)**	**Magnehelic i ("H2O^0.5)**	**Magnehelic Flow [1,2] (cfm)**
2.50	1.62	35.76	2.27	1.54	36.20
3.00	1.78	39.15	2.58	1.65	38.55
3.50	1.92	42.26	3.13	1.82	42.31
4.00	2.05	45.16	3.60	1.95	45.25
4.50	2.18	47.88	4.05	2.07	47.90

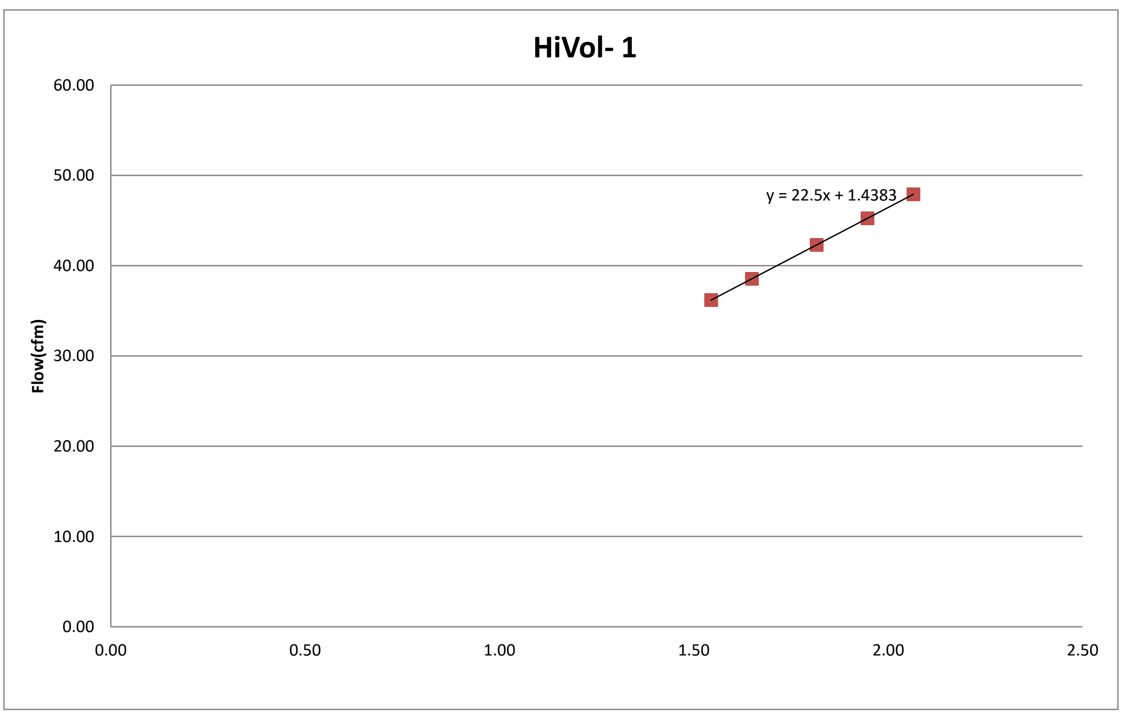
Orifice:
[1] Based on Orifice Calibration Regression
[2] Flows are corrected to reference conditions

Magnehelic:
[1] Based on actual calibration regression
[2] Flows are corrected to reference conditions

Calibration Regression Output:

Constant	1.44
Std Err of Y Est	0.43
R Squared	0.99
No. of Observations	5.00
Degrees of Freedom	3.00
X Coefficient(s)	22.50
Std Err of Coef.	1.02

y= 22.50 i + 1.44



Done By: JDF
Reviewed By:

Hi-Vol Magnehelic Gauge Calibrations

Station: Cove
Date: 9-Dec-18

Calibration Temperature	270.15 K		**Tref**	283 K
Calibration Pressure	101.2 kPa		**Pref**	101.325 kPa

Orifice Calibration Data

Pressure ("H20)	**i ("H2O^0.5)**	**Flow[1,3] (cfm)**	**Flow[2,3] (cfm)**
1.5	1.19	26.27	26.31
2.5	1.54	33.85	33.88
3	1.68	37.10	37.09
3.5	1.82	40.15	40.03
6	2.38	52.27	52.32

[1] Based on Calibration from Tisch (manufacturer of Orifice)
[2] Based on regression from calibrated orifice
[3] Flows are corrected to reference conditions

Calibration Regression Output:

Constant	**0.31**
Std Err of Y Est	0.08
R Squared	1.00
No. of Observations	5
Degrees of Freedom	3
X Coefficient(s)	**21.85**
Std Err of Coef.	0.09

y= 21.85 i + 0.31

Sampler ID.
Site Location
Motor Serial No.

Orifice

Pressure ("H20)	**i ("H2O^0.5)**	**Flow [1,2] (cfm)**
2.50	1.62	35.65
3.00	1.77	39.03
3.50	1.91	42.13
4.00	2.05	45.02
4.50	2.17	47.73

[1] Based on Orifice Calibration Regression
[2] Flows are corrected to reference conditions

Magnehelic

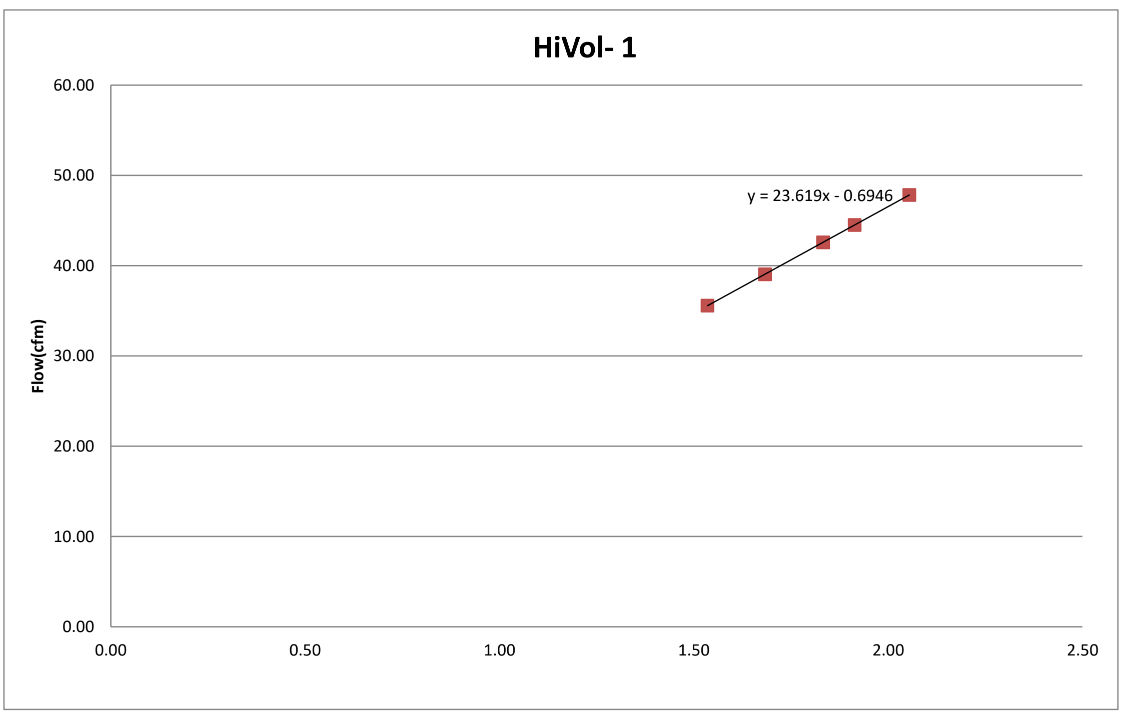
Pressure ("H20)	**i ("H2O^0.5)**	**Flow [1,2] (cfm)**
2.25	1.54	35.57
2.71	1.68	39.06
3.21	1.83	42.59
3.50	1.91	44.51
4.03	2.05	47.83

[1] Based on actual calibration regression
[2] Flows are corrected to reference conditions

Calibration Regression Output:

Constant	-0.69
Std Err of Y Est	0.41
R Squared	0.99
No. of Observations	5.00
Degrees of Freedom	3.00
X Coefficient(s)	23.62
Std Err of Coef.	1.01

y= 23.62 i + -0.69



Done By: JDF
Reviewed By:

Hi-Vol Magnehelic Gauge Calibrations

Station: Beach
Date: 9-Dec-18

Calibration Temperature	266.35	K	**Tref**	283	K
Calibration Pressure	101.4	kPa	**Pref**	101.325	kPa

Orifice Calibration Data

Pressure ("H20)	**i ("H2O^0.5)**	**Flow[1,3] (cfm)**	**Flow[2,3] (cfm)**
1.5	1.19	26.27	26.31
2.5	1.54	33.85	33.88
3	1.68	37.10	37.09
3.5	1.82	40.15	40.03
6	2.38	52.27	52.32

[1] Based on Calibration from Tisch (manufacturer of Orifice)
[2] Based on regression from calibrated orifice
[3] Flows are corrected to reference conditions

Calibration Regression Output:

Constant	**0.31**
Std Err of Y Est	0.08
R Squared	1.00
No. of Observations	5
Degrees of Freedom	3
X Coefficient(s)	**21.85**
Std Err of Coef.	0.09

y= 21.85 i + 0.31

Sampler ID.
Site Location
Motor Serial No.

Orifice Pressure ("H20)	**Orifice i ("H2O^0.5)**	**Orifice Flow [1,2] (cfm)**	**Magnehelic Pressure ("H20)**	**Magnehelic i ("H2O^0.5)**	**Magnehelic Flow [1,2] (cfm)**
2.50	1.63	35.94	2.25	1.55	35.86
3.00	1.79	39.34	2.71	1.70	39.37
3.50	1.93	42.46	3.21	1.85	42.93
4.00	2.06	45.38	3.50	1.93	44.86
4.50	2.19	48.11	4.03	2.07	48.21

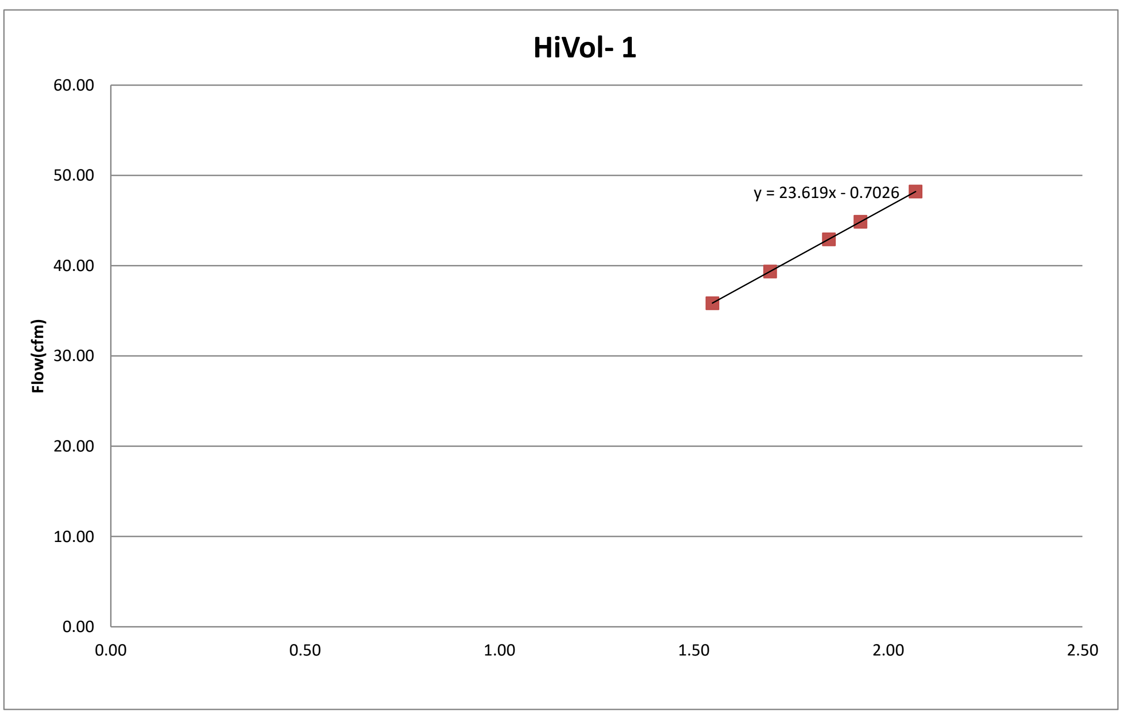
Orifice:
[1] Based on Orifice Calibration Regression
[2] Flows are corrected to reference conditions

Magnehelic:
[1] Based on actual calibration regression
[2] Flows are corrected to reference conditions

Calibration Regression Output:

Constant	-0.70
Std Err of Y Est	0.41
R Squared	0.99
No. of Observations	5.00
Degrees of Freedom	3.00
X Coefficient(s)	23.62
Std Err of Coef.	1.01

y= 23.62 i + -0.70



Done By: JDF
Reviewed By:

APPENDIX I

Sample Date: 09/30/18

Installation Date: 09/30/18

				Initial Readings			Final Readings		
	Sample ID	Media Number		Clock Time	Timer	Delta P	Clock Time	Timer	Delta P
TSP	OPG-SEP30	18091846		2053.55	7:10	2.80"	6:00	2071.49	3.6"
	COVE-SEP30	18091347		8:40	60.80	2.8"	6.59		3.8"
	BEACH-SEP30	18091848		8:23	7032.45	3.8"	7:09	7055.13	3.8"
	Sample ID	Media Number		Clock Time	Timer	Delta P	Clock Time	Timer	Delta P
PUF	OPG-SEP30	#4		7:13	8010.83	40"	6:30	8028.61	40"
	COVE-SEP30	#8		8:40	2072.18	40"	6:59	2094.50	39"
	BEACH-SEP30	#6		8:23	2432.97	40"	7:09	2455.60	40"
	Sample ID	Can #	Mass Flow	Clock Time	Flow Rate	Delta P	Clock Time	Flow Rate	Delta P
SUMA	OPG-SEP30	17358	73557	7:10		-27	6:00		-10
	COVE-SEP30	17986	1403	8:46		-29	6:59		-10
	BEACH-SEP30	23463	1314	8:25		-31	7:09		-10
	Sample ID	Media Number		Clock Time	Flow Rate		Clock Time	Flow Rate	
Hg Tubes	OPG-SEP30	685305293-685305292		7:16	.998 1.00 1.00		6:00	.999 .998	.999
	COVE-SEP30	685305294 - 685305296		8:46	.990 .990	.990	6:59	.995 .995	.990
	BEACH-SEP30	685305258 - 685305291		8:25	1.01 1.00	1.00	7:09	1.00 1.00	1.00

* SAMPLE 09/30 -> HIVOL / PUF OPG WERE TRIPPED FROM HEAVY RAIN - FOUND IN AM (10/01)

* SAMPLE 10/01 -> HIVOL / PUF - BEACH WERE TRIPPED FROM HEAVY RAIN - FOUND IN AM (10/02)

* ON 10/01/18 COVE HIVOL WAS PAUSED FOR MASS FLOW REPLACEMENT PAUSE @ 10/01/18 4:24 TIMER (9.41) 2.6" H_2O START @ 10/01/18 5:17 TIMER 3.3" (9.62)

* ON 10/01/18 OPG HIVOL WAS PAUSED FOR MASS FLOW REPAIR -> PAUSE @ 10/01/18 TIMER 6:04 (2081.03) 2.8" H_2O START @ 10/01/2018 6:21 TIMER (2081.21) 3.31" H_2O

Sample Date: 10/01/18
Installation Date: 10/01/18

				Initial Readings			Final Readings		
TSP	Sample ID	Media Number		Clock Time	Timer	Delta P	Clock Time	Timer	Delta P
	OPG-10/01	18091329		8:28	2071.44	2.60	8:05	2092.94	3.2
	COVE-10/01	18091330		8:10	1.41	2.6	7:20	23.80	3.35
	BEACH-10/01	18091331		7:39	7055.13	3.6	6:48	7065.75	3.89
PUF	Sample ID	Media Number		Clock Time	Timer	Delta P	Clock Time	Timer	Delta P
	OPG-10/01	#9		8:28	8028.61	40"	6:00	8050.12	40"
	COVE-10/01	#1		8:10	2094.52	39"	7:20	2117.61	40"
	BEACH 10/01	#3		7:39	2455.60	40"	6:48	2466.23	39"
SUMA	Sample ID	Can #	Mass Flow	Clock Time	Flow Rate	Delta P	Clock Time	Flow Rate	Delta P
	OPG-10/01	13930	13557	8:28	-	-31	6:16		-5
	COVE-10/01	1618	1403	8:10		-29	7:20		-6
	BEACH 10/01	23473	1314	7:39		-27	6:48		-5
Hg Tubes	Sample ID	Media Number		Clock Time	Flow Rate		Clock Time	Flow Rate	
	OPC-10/01	685305316 - 685350515		8:28	.990 .99	.99	6:10	1.00 1.00	1.00
	COVE-10/01	685305295 - 685350290		8:10	1.00 1.00	1.00	7:20	.99 .99	.99
	BEACH 10/01	685305289 - 685305297		7:39	1.00 1.00	1.00	6:48	1.01 1.00	1.00

Sample Date: 10/02/18

Installation Date: 10/02/18

				Initial Readings			Final Readings		
	Sample ID	Media Number		Clock Time	Timer	Delta P	Clock Time	Timer	Delta P
TSP	OPG - 10/02	18091345		6:05	2092.95	3.2	6:05	2116.63	3.27
	Cove - 10/02	18091343		7:38	23.81	3.26	7:33	47.71	3.33
	BEACH - 10/02	18091344		7:06	7065.77	3.75	7:00	7099.64	3.76
	Sample ID	Media Number		Clock Time	Timer	Delta P	Clock Time	Timer	Delta P
PUF	OPG - 10/02	#5		6:05	8050.12	40"	6:05	8073.86	40"
	Cove - 10/02	#10		7:38	2117.62	40"	7:33	2141.51	40"
	BEACH 10/02	#7		7:06	2466.24	40"	7:00	2490.11	39"
	Sample ID	Can #	Mass Flow	Clock Time	Flow Rate	Delta P	Clock Time	Flow Rate	Delta P
SUMA	OPG - 10/02	1616	13557	6:24		-30	6:06		-5
	Cove - 10/02	11608	1403	7:38		-28	7:33		-6
	BEACH 10/02	5838	1314	7:06		-29	7:00		-6
	Sample ID	Media Number		Clock Time	Flow Rate		Clock Time	Flow Rate	
Hg Tubes	OPG - 10/02	6853505309 - 6853505314		6:24	.992 .995	.998	6:06	.999 .998	.998
	Cove 10/02	6853505310 - 6853505308		7:38	.981 .990	.985	7:33	.992 .990	.991
	BEACH 10/02	6853505317 - 6853505313		7:06	.939 .985	.935	7:00	.937 .929	.936

Sample Date: 10/03/18

Installation Date: 10/03/18

				Initial Readings			Final Readings		
	Sample ID	Media Number		Clock Time	Timer	Delta P	Clock Time	Timer	Delta P
TSP	OPG - 10/03	18091334		6:27	2116.64	3.20	6:10	2140.44	3.20
	COVE 10/03			7:51	47.72	3.40	7:20	70.81	3.40
	BEACH 10/03			7:18	7089.66	3.72	6:48	7113.87	3.70
	Sample ID	Media Number		Clock Time	Timer	Delta P	Clock Time	Timer	Delta P
PUF	OPG - 10/03	#2		6:27	8073.87	40"	6:10	8097.67	39"
	COVE - 10/03	#20		7:51	2141.52	40"	6:48	2164.60	42"
	BEACH - 10/03	#16		7:18	2490.11	40"	7:20	2514.35	40"
	Sample ID	Can #	Mass Flow	Clock Time	Flow Rate	Delta P	Clock Time	Flow Rate	Delta P
SUMA	OPG - 10/03	15296~~8~~	13557	6:27		-28	6:10		-5
	COVE - 10/03	11380	1403	7:51		-29	7:20		-6
	BEACH - 10/03	11635	1314	7:18		-28	6:48		-5
	Sample ID	Media Number		Clock Time	Flow Rate		Clock Time	Flow Rate	
Hg Tubes	OPG - 10/03	7716904899 - 7716904894		6:27	.932 .942	.955	6:10	.945 .952	.951
	COVE - 10/03	7716904901 - 7716904896		7:51	.996 .981	.991	7:20	.990 .980	.990
	BEACH - 10/03	7716904893 - 7716904898		7:18	.960 .961 .969		6:48	.961 .961	.960

Sample Date: 10/04/18
Installation Date: 10/04/18

				Initial Readings			Final Readings		
	Sample ID	Media Number		Clock Time	Timer	Delta P	Clock Time	Timer	Delta P
TSP	OPG-Oct04			6:35	2140.44	3.2	5:41	2163.54	3.1
	Cove-Oct04			7:18	70.82	3.4	6:05	93.18	3.2
	Beach-Oct04			7:50	7113.88	3.8	6:22	7136.0	3.82
	Sample ID	Media Number		Clock Time	Timer	Delta P	Clock Time	Timer	Delta P
PUF	OPG-Oct04	#18		6:35	8097.67	39"	5:41	8120.77	40"
	Cove-Oct04	#17		7:18	2164.60	42"	6:05	2186.98	42"
	Beach-Oct04	#19		7:50	2514.35	40"	6:22	2536.47	37"
	Sample ID	Can #	Mass Flow	Clock Time	Flow Rate	Delta P	Clock Time	Flow Rate	Delta P
SUMA	OPG-Oct04	11389	13557	6:35		-28	5:41		-6
	Cove-Oct04	17361	1403	7:18		-28	6:05		-7
	Beach-Oct04	1579	1314	7:50		-28	6:22		-7
	Sample ID	Media Number		Clock Time	Flow Rate		Clock Time	Flow Rate	
Hg Tubes	OPG-Oct04	685350218-685350227		6:35	.984 .980	.980	5:41	.980 .980	.980
	Cove-Oct04	6853505226-6853505221		7:18	.990 .992	.989	6:05	.991 .990	.990
	Beach-Oct04	68535o219-6853605224		7:50	.971 .975	.978	6:22	.977 .977	.975

Sample Date: 10/10/18

Installation Date: 10/10/18

				Initial Readings			Final Readings		
	Sample ID	Media Number		Clock Time	Timer	Delta P	Clock Time	Timer	Delta P
TSP	OPG - Oct 10	18091335		6:43	2177.36	3.2	6:04	2200.69	3.32
	Cove - Oct 10	18091336		7:21	102.28	3.2	6:44	125.67	3.11
	Beach - Oct 10	18091337		7:51	7136.06	3.7	7:12	7159.49	3.65
	Sample ID	Media Number		Clock Time	Timer	Delta P	Clock Time	Timer	Delta P
PUF	OPG - Oct 10	#12		6:43	8120.86	40"	6:04	8144.14	41"
	Cove - Oct 10	#13		7:21	2186.99	40"	6:44	2210.39	39"
	Beach - Oct 10	#15		7:51	2536.49	40"	7:12	2559.95	38"
	Sample ID	Can #	Mass Flow	Clock Time	Flow Rate	Delta P	Clock Time	Flow Rate	Delta P
SUMA	OPG - Oct 10	12959	13557	6:43	-	-28	6:04		-5
	Cove - Oct 10	18200	1403	7:21		-29	6:44		-6
	Beach - Oct 10	18187	1314	7:51		-28	7:12		-9
	Sample ID	Media Number		Clock Time	Flow Rate		Clock Time	Flow Rate	
Hg Tubes	OPG - Oct 10	6853505225-6853505176		6:43	918.5/920.5	921.2	6:04	961.7/975.2	972.2
	Cove - Oct 10	6853505170-6853505223		7:21	946.8/945.1	945.2	6:44	961/965	961
	Beach - Oct 10	6853505220-6853505171		7:51	964.71	977.1/977.1	7:12	977/975	976

Sample Date: 10/11/18

Installation Date: 10/11/18

				Initial Readings			Final Readings		
	Sample ID	Media Number		Clock Time	Timer	Delta P	Clock Time	Timer	Delta P
TSP	OPG-Oct11	18091940		6:23	2200.70	3.20	5:55	2224.21	3.31
	Cove-Oct11	18091941		7:03	125.68	3.30	6:31	149.41	3.13
	Beach-Oct11	18091942		7:33	7159.60	3.70	7:07	7183.05	3.75
	Sample ID	Media Number		Clock Time	Timer	Delta P	Clock Time	Timer	Delta P
PUF	OPG-Oct11	#14		6:23	8144.15	40"	5:55	8167.66	40"
	Cove-Oct11	#4		7:03	2210.40	40"	6:31	2233.86	40"
	Beach-Oct11	#2		7:33	2559.94	40"	7:07	2583.50	40"
	Sample ID	Can #	Mass Flow	Clock Time	Flow Rate	Delta P	Clock Time	Flow Rate	Delta P
SUMA	OPG-Oct11	11614	13557	6:23	3.48	-24	5:55	3.30	-5
	Cove-Oct11	18182	1403	7:03	3.40	-28	6:31	3.29	-7
	Beach-Oct11	17999	1314	7:33	2.91	-29	7:07	2.80	-8
	Sample ID	Media Number		Clock Time	Flow Rate		Clock Time	Flow Rate	
Hg Tubes	OPG-Oct11	6853505169 - 7716904995		6:23	979.1/980.2	980.5	5:55	980/981	981
	Cove-Oct11	-		7:03	982.6/982.9	981.5	6:31	982/982	982
	Beach-Oct11	-		7:33	1000	999.7/998.5	7:07	999/998	998

Sample Date: 10/12/18
Installation Date: 10/12/18

				Initial Readings			Final Readings		
TSP	Sample ID	Media Number		Clock Time	Timer	Delta P	Clock Time	Timer	Delta P
	OPG-Oct 12	18092701		6:13	2224.22	3.31	6:02	2248.05	3.33
	Cove-Oct 12	18092700		6:52	149.16	3.23	6:30	172.78	3.17
	Beach-Oct 12	18091945		7:25	7183.06	3.75	6:46	7206.39	3.74
PUF	Sample ID	Media Number		Clock Time	Timer	Delta P	Clock Time	Timer	Delta P
	OPG-Oct 12	#3		6:13	8167.67	30"	6:02	8191.49	30"
	Cove-Oct 12	#5		6:52	2233.87	40"	6:30	2257.5	40"
	Beach-Oct 12	#1		7:25	2583.5	40"	6:46	2606.85	40"
SUMA	Sample ID	Can #	Mass Flow	Clock Time	Flow Rate	Delta P	Clock Time	Flow Rate	Delta P
	OPG-Oct 12	1578	13557	6:13	3.52	-27	6:03	3.35	-4
	Cove-Oct 12	1617	1403	6:52	3.4	-29	6:30	3.31	-6
	Beach-Oct 12	11355	1314	7:25	3.29	-28	6:46	3.21	-6
Hg Tubes	Sample ID	Media Number		Clock Time	Flow Rate		Clock Time	Flow Rate	
	OPG-Oct 12	7716904962-6853505174		6:13	983.1/988.1/980.1		6:03	950.1/956.1/956.1	
	Cove-Oct 12	7716904897-7716904911		6:52	946.5/948.1/948.5		6:30	955.1/955.5/956.1	
	Beach-Oct 12	7716904904-7716904912		7:25	988.3/988.1/988.5		6:46	981.5/981.7/981.9	

Sample Date: Dec 04/2018
Installation Date: 12/04/18

				Initial Readings			Final Readings		
TSP	Sample ID	Media Number		Clock Time	Timer	Delta P	Clock Time	Timer	Delta P
	OPG - Dec04	18111472		6:33	2277.27	3.3	6:15	2301.00	3.3
	Cove - Dec04	18111473		7:02	1037.14	3.15	6:45	1060.83	3.2
	Beach - Dec04	18111479		7:27	7239.16	3.40	7:08	7266.85	3.4
PUF	Sample ID	Media Number		Clock Time	Timer	Delta P	Clock Time	Timer	Delta P
	OPG - Dec04	XAD #8		6:33	8262.6	40"	6:15	8285.71	40"
	Cove - Dec04	XAD #9		7:02	2324.68	40"	6:45	2348.35	40"
	Beach - Dec04	XAD #4		7:27	2829.36	40"	7:08	2853.05	39"
SUMA	Sample ID	Can #	Mass Flow	Clock Time	Flow Rate	Delta P	Clock Time	Flow Rate	Delta P
	OPG - Dec04	2832	Fx 950	6:33		-23	6:15		-3
	Cove - Dec04	18282	Fx 763	7:02		-27	6:45		-2.5
	Beach - Dec04	T-21631	Fx 1380	7:27		-29	7:08		-3
Hg Tubes	Sample ID	Media Number		Clock Time	Flow Rate		Clock Time	Flow Rate	
	OPG - Dec04	7971602598 - 7971602593		6:33	.980		6:15	.981	
	Cove - Dec04	7971602592 - 7971602595		7:02	.991		6:45	.983	
	Beach - Dec04	7971602597 - 7971602591		7:27	.990		7:08	.990	

Sample Date: Dec 5/2018
Installation Date: Dec 5/2018

				Initial Readings			Final Readings		
TSP	Sample ID	Media Number		Clock Time	Timer	Delta P	Clock Time	Timer	Delta P
	OPG-Dec05	1811475		6:27	2301.61	3.31	6:11	2324.77	3.33
	Cove-Dec05	1811476		6:53	1060.84	3.2	6:40	1084.50	3.15
	Beach-Dec05	1811477		7:12	7260.88	3.41	7:02	7284.61	3.85
PUF	Sample ID	Media Number		Clock Time	Timer	Delta P	Clock Time	Timer	Delta P
	OPG-Dec05	#13		6:27	8285.72	40"	6:11	8309.45	39"
	Cove-Dec05	#6		6:53	2348.31	40"	6:40	2372.66	40"
	Beach-Dec05	#18		7:12	2853.06	40"	7:02	2876.79	40"
SUMA	Sample ID	Can #	Mass Flow	Clock Time	Flow Rate	Delta P	Clock Time	Flow Rate	Delta P
	OPG-Dec05	1260	Fx 950	6:27		-26	6:11		-2.5
	Cove-Dec05	14244	Fx 763	6:53		-27	6:40		-3.5
	Beach-Dec05	125	Fx 1386	7:12		-29	7:02		-3
Hg Tubes	Sample ID	Media Number		Clock Time	Flow Rate		Clock Time	Flow Rate	
	OPG-Dec05	7971602747-7971602599		6:27	1.01		6:11	.991	
	Cove-Dec05	7971602745-7971602596		6:53	.981		6:40	.985	
	Beach-Dec05	7971602594-7971602590		7:12	.996		7:02	.991	

Sample Date: Dec 06/2018
Installation Date: Dec 06/2018

				Initial Readings			Final Readings		
TSP	Sample ID	Media Number		Clock Time	Timer	Delta P	Clock Time	Timer	Delta P
	OPG - Dec06	18111478		6:21	2324.78	3.35	4:56	2347.32	3.38
	Cove - Dec06	18111479		6:50	1084.51	3.31	5:25	1107.04	3.41
	Beach - Dec06	18111480		7:12	7284.62	3.48	5:45	7307.16	3.45
PUF	Sample ID	Media Number		Clock Time	Timer	Delta P	Clock Time	Timer	Delta P
	OPG - Dec06	#17		6:21	8309.45	40"	4:56	8331.99	40"
	Cove - Dec06	#21		6:50	2372.06	40"	5:25	2394.62	40"
	Beach - Dec06			7:12	2879.79	40"	5:45	2902.33	40"
SUMA	Sample ID	Can #	Mass Flow	Clock Time	Flow Rate	Delta P	Clock Time	Flow Rate	Delta P
	OPG - Dec06	23732	Fx 950	6:21		-27	4:56		-5
	Cove - Dec06	7805	Fx 763	6:50		-27	5:25		-4
	Beach - Dec06	18180	Fx 1380	11:30		-28	5:45		-6
Hg Tubes	Sample ID	Media Number		Clock Time	Flow Rate		Clock Time	Flow Rate	
	OPG - Dec06	7971602744 - 7971602742		6:21	1.01		4:56	1.00	
	Cove - Dec06	7971602748 - 7971602746		6:50	1.00		5:25	1.05	
	Beach - Dec06	7971602743 - 7971602740		7:12	.98		5:45	0.972	

Sample Date: Dec/07/18

Installation Date: Dec 07/18

				Initial Readings			Final Readings		
	Sample ID	Media Number		Clock Time	Timer	Delta P	Clock Time	Timer	Delta P
TSP	OPG - Dec07	18111481		5:02	2347.35	3.32	5:12	2371.49	3.3
	Cove - Dec07	18111482		5:31	1107.07	3.4	5:47	1131.31	3.31
	Beach - Dec07	18111483		5:55	7307.17	3.2	6:05	7331.34	3.30
	Sample ID	Media Number		Clock Time	Timer	Delta P	Clock Time	Timer	Delta P
PUF	OPG - Dec07	#12		5:02	8331.99	40"	5:12	8356.13	40"
	Cove - Dec07	#1		5:31	2394.62	40"	5:47	2418.85	40"
	Beach - Dec07	#11		5:55	2902.33	40"	6:05	2926.50	40"
	Sample ID	Can #	Mass Flow	Clock Time	Flow Rate	Delta P	Clock Time	Flow Rate	Delta P
SUMA	OPG - Dec07	14249	FX 950	7:03		-25	5:12		-4
	Cove - Dec07	19281	FX 763	7:15		-26	5:47		-3
	Beach - Dec07	29307	FX 1380	7:19		-25	6:05		-2
	Sample ID	Media Number		Clock Time	Flow Rate		Clock Time	Flow Rate	
Hg Tubes	OPG - Dec07	7971602543 - 7971602546		5:02	.991		5:12	.989	
	Cove - Dec07	7971602749 - 7971602741		5:31	.998		5:47	.995	
	Beach - Dec07	7971602547 - 7971602542		5:55	.988		6:05	.980	

Sample Date: Dec 08/2018
Installation Date: Dec 08/2018

				Initial Readings			Final Readings		
	Sample ID	Media Number		Clock Time	Timer	Delta P	Clock Time	Timer	Delta P
TSP	OPG - Dec08	18111484		5:20	2371.49	3.3	5:19	2395.48	3.20
	Cove - Dec08	18111485		5:55	1131.32	3.31	5:39	1155.04	3.30
	Beach - Dec08	18111491		6:16	7331.33	3.45	5:52	7354.92	3.35
	Sample ID	Media Number		Clock Time	Timer	Delta P	Clock Time	Timer	Delta P
PUF	OPG - Dec08	#20		5:20	8356.14	40"	5:19	8380.1	40"
	Cove - Dec08	#14		5:55	2418.85	40"	5:39	2442.59	40"
	Beach - Dec08	#10		6:16	2926.5	40"	5:52	2950.07	40"
	Sample ID	Can #	Mass Flow	Clock Time	Flow Rate	Delta P	Clock Time	Flow Rate	Delta P
SUMA	OPG - Dec08	T-21673	FX 950	5:20		-27	5:19		-5
	Cove - Dec08	T-21755	FX 763	5:55		-26	5:39		-4
	Beach - Dec08	17180	FX 1380	7:26		-26	5:52		-4
	Sample ID	Media Number		Clock Time	Flow Rate		Clock Time	Flow Rate	
Hg Tubes	OPG - Dec08	7971602544 - 7971602549		5:20	.995		5:19	.965	
	Cove - Dec08	7971602540 - 7971602545		5:55	.988		5:39	.991	
	Beach - Dec08	7971602541 - 7971602548		6:16	1.02		5:52	1.05	

Appendix H

Ambient Air Monitoring Assessment – Details

Appendix H-1

Ambient Monitoring Station Selection Methodology and Locations

Appendix H-1: Analysis of Optimum Locations for Ambient Monitors

Prior to the start of the ambient monitoring program, a set of modelling exercises was completed to identify the optimum locations for the ambient monitors based on historical meteorological data for October. The methodology is described as follows:

<u>Primary and Secondary Downwind Stations</u>

- Review the 5-year site-specific meteorological data provided by the Ministry to determine the primary and secondary wind direction ranges for October.
- Create a custom/filtered October meteorological data set to only include hours when winds were blowing from the primary and secondary wind direction ranges determined through the previous step.
- Run AERMOD using the two custom meteorological data sets. Modelling was performed for the kiln stack only with a unit emission rate of 1 g/s.
- For each station modelling run, determine the most frequent location/area for the maximum POI concentration (based on 90% of the maximum contour line) based on the hourly modelling contours.

<u>Upwind Station</u>

- Select the most feasible location upwind of the kiln stack based on the primary wind direction.

The optimum locations of the three stations are illustrated in Figure H-1-1.

Figure H-1-1: Optimum Locations for Ambient Monitors

Appendix H-2

Records of Meteorological Conditions and Analysis of Wind Direction

Table H-2-1: Upwind and Downwind Analysis for Meteorological Stations

Scenario	Baseline			Baseline			Baseline			Baseline		
Date	30-Sep-18			1-Oct-18			2-Oct-18			4-Oct-18		
Weather Station ID	Cove	Dock	OPG	Cove	Dock	OPG	Cove	Dock	OPG	Cove	Dock	OPG
Upwind/Downwind/Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Upwind

Scenario	Alt Fuels			Alt Fuels			Alt Fuels			Alt Fuels		
Date	3-Oct-18			10-Oct-18			11-Oct-18			12-Oct-18		
Weather Station ID	Cove	Dock	OPG	Cove	Dock	OPG	Cove	Dock	OPG	Cove	Dock	OPG
Upwind/Downwind/Background	Upwind	Background	Downwind	Background	Background	Background	Downwind	Background	Upwind	Downwind	Downwind	Upwind

Scenario	Alt Fuels			Alt Fuels			Alt Fuels		
Date	4-Dec-18			5-Dec-18			6-Dec-18		
Weather Station ID	Cove	Dock	OPG	Cove	Dock	OPG	Cove	Dock	OPG
Upwind/Downwind/Background	Background	Downwind	Upwind	Background	Background	Background	Background	Downwind	Upwind

Scenario	Post Baseline			Post Baseline		
Date	7-Dec-18			8-Dec-18		
Weather Station ID	Cove	Dock	OPG	Cove	Dock	OPG
Upwind/Downwind/Background	Upwind	Background	Background	Background	Background	Background